# E-Letter on Systems, Control, & Signal Processing
## Issue 386, October 2020

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Welcome to Issue 386 of the CSS E-letter available here.

– To submit new articles, visit article submissions on the E-Letter website.
– To **subscribe**, send an empty email to eletter-css-join@lists.it.utsa.edu and you will be automatically subscribed to the CSS E-Letter.
– To **unsubscribe**, please send a blank email to eletter-css-leave@lists.it.utsa.edu and you will be automatically unsubscribed.

The next E-Letter will be mailed out at the beginning of November 2020.

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6.9 PhD: Louisiana State University, USA
6.10 PhD: Imperial College London, UK
6.11 PhD: The University of British Columbia, Canada

# 1 IEEE CSS Headlines

**1.1. Become a CSS Member**
Contributed by: Ahmad Taha, ahmad.taha@utsa.edu

Become a CSS Member by visiting the following link https://bit.ly/2ZBWCCs.

**1.2. Follow the CSS Social Media Accounts**
Contributed by: Ahmad Taha and Ankush Chakrabarty ahmad.taha@utsa.edu, chakrabarty@merl.com

Follow us on Twitter https://twitter.com/CSSIEEE
Like us on Facebook https://facebook.com/CSSIEEE

**1.3. CSS Technically Cosponsored Events**
Contributed by: Luca Zaccarian, CSS AE Conferences, zaccarian@laas.fr

The following items have been recently included in the list of events technically cosponsored by the IEEE Control Systems Society:

- 2020 IEEE 17th India Council International Conference (INDICON 2020). New Delhi, India. December 11-13, 2020. http://www.indicon2020.in/

- 29th Mediterranean Conference on Control and Automation (MED 2021). Brindisi, Italy. June 22-25, 2021. http://www.med2021.poliba.it/

- 24th International Conference on System Theory, Control and Computing (ICSTCC 2020). Sinaia, Romania. October 8-10, 2020. http://ace.ucv.ro/icstcc2020/

- 25th International Conference on Methods and Models in Automation and Robotics (MMAR 2020). Miedzyzdroje, Poland. August 23-26, 2021. http://www.mmar.edu.pl

For a full listing of CSS technically cosponsored conferences, please visit
http://ieeecss.org/conferences/technically-co-sponsored
and for a list of the upcoming and past CSS main conferences please visit
http://ieeecss.org/conferences/financially-sponsored

### 1.4. CSS Publications Content Digest
Contributed by: Kaiwen Chen, kaiwen.chen16@imperial.ac.uk

The IEEE Control Systems Society Publications Content Digest is a novel and convenient guide that helps readers keep track of the latest published articles.

The CSS Publications Content Digest, available at

http://ieeecss.org/publications-content-digest

provides lists of current tables of contents of the periodicals sponsored by the Control Systems Society. Each issue offers readers a rapid means to survey and access the latest peer-reviewed papers of the IEEE Control Systems Society. We also include links to the Society's sponsored Conferences to give readers a preview of upcoming meetings.

### 1.5. IEEE Control Systems Letters
Contributed by: Francesca Bettini, bettini@dei.unipd.it

IEEE Control Systems Letters
Volume 4 (2020), Issue 4 (October)
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=7782633

**Papers:**

- On Dead-Time Compensation in Repetitive Control, L. Mirkin – p. 791
- On Assessing Control Actions for Epidemic Models on Temporal Networks, L. Zino, A. Rizzo, and M. Porfiri – p. 797
- Observability of Nonlinear Time–Delay Systems and Its Application to Their State Realization, C. Califano and C. H. Moog – p. 803
- Uniform Detectability of Linear Time Varying Systems With Exponential Dichotomy, M. Tranninger, R. Seeber, M. Steinberger, and M. Horn – p. 809
- Near-Optimal MAP Estimation for Markov Jump Linear Systems Using Relaxed Dynamic Programming, A. R. P. Andriën and D. J. Antunes – p. 815
- Controllability Maximization of Large-Scale Systems Using Projected Gradient Method, K. Sato and A. Takeda – p. 821
- Compositional Quantification of Invariance Feedback Entropy for Networks of Uncertain Control Systems, M. S. Tomar and M. Zamani – p. 827
- Amidst Data-Driven Model Reduction and Control, N. Monshizadeh – p. 833
- On Multiconsensus of Multi-Agent Systems Under Aperiodic and Asynchronous Sampling, M. Mattioni – p. 839
- Compositional Construction of Control Barrier Certificates for Large-Scale Stochastic Switched Systems, A. Nejati, S. Soudjani, and M. Zamani – p. 845
- Integrated Neural Networks for Nonlinear Continuous-Time System Identification, B. Mavkov, M. Forgione, and D. Piga – p. 851
- Feedback Stabilization of Third-Order Switched Linear Control Systems, Z. Sun – p. 857
- A Robust Internal Model-Based Fractional Order Controller for Fractional Order Plus Time Delay Processes, P. P. Arya and S. Chakrabarty – p. 862

### 1.6. IEEE Transactions on Automatic Control
Contributed by: Alessandro Astolfi, ieeetac@imperial.ac.uk

Volume 65 (2020), Issue 9 (September)

**Special Issue On Security And Privacy Of Distributed Algorithms And Network Systems**

**Editorial:**

**Special Issue Papers:**

- An Attack-Resilient Pulse-Based Synchronization Strategy for General Connected Topologies Zhenqian Wang, Yongqiang Wang, p. 3784
- A Distributed Cyber-attack Detection Scheme with Application to DC Microgrids Alexander Julian Gallo, Mustafa Sahin Turan, Francesca Boem, Thomas Parisini, Giancarlo Ferrari-Trecate, p. 3800
- Actuator Security Indices Based on Perfect Undetectability: Computation, Robustness, and Sensor Placement Jezdimir Milosevic, AndrÈ M. H. Teixeira, Karl H. Johansson, Henrik Sandberg, p. 3816
- Optimizing Attack Schedules Based on Energy Dispatch over Two-Hop Relay Networks Ruimeng Gan, Jinliang Shao, Yue Xiao, Heng Zhang, Wei Xing Zheng, p. 3832
- Novel Stealthy Attack and Defense Strategies for Networked Control Systems Yanbing Mao, Hamidreza Jafarnejadsani, Pan Zhao, Emrah Akyol, Naira Hovakimyan, p. 3847
- Design of Privacy-Preserving Dynamic Controllers Yu Kawano, Ming Cao, p. 3863

**Special Issue Technical Notes:**

- Almost sure stability of nonlinear systems under randomly impulsively sequential attacks Wangli He, Feng Qian, Qing-Long Han, Guanrong Chen, p. 3879
- Privacy-Preserving Distributed Averaging via Homomorphically Encrypted Ratio Consensus Christoforos N. Hadjicostis, Alejandro D. Dominguez-Garcia, p. 3887
- An Online Approach to Physical Watermark Design Hanxiao Liu, Yilin Mo, Jiaqi Yan, Lihua Xie, Karl H. Johansson, p. 3895
- Centralized Versus Decentralized Detection of Attacks in Stochastic Interconnected Systems Rajasekhar Anguluri, Vaibhav Katewa, Fabio Pasqualetti, p. 3903
- Malicious Attacks on State Estimation against Distributed Control Systems An-Yang Lu, Guang-Hong Yang, p. 3911
- Optimal Partial Feedback Attacks in Cyber-Physical Power Systems Guangyu Wu, Gang Wang, Jian Sun, Jie Chen, p. 3919
- Stealthy Actuator Signal Attacks in Stochastic Control Systems: Performance and Limitations Chongrong Fang, Jiming Chen, Yifei Qi, Rui Tan, Wei Xing Zheng, p. 3927
- Fully distributed resilient state estimation based on distributed median solver Jin Gyu Lee, Junsoo Kim, Hyungbo Shim, p. 3935
- Switching-like Event-triggered Control for Networked Control Systems under Malicious Denial of Service Attacks Chen Peng, Hongtao Sun, p. 3943
- Secure and Private Implementation of Dynamic Controllers Using Semi-Homomorphic Encryption Carlos Murguia, Farhad Farokhi, Iman Shames, p. 3950

**1.7. IEEE Transactions on Control of Network Systems**
    Contributed by: Arij Barakat, arij.barakat@kaust.edu.sa

IEEE Transactions on Control of Network Systems
Volume 7 (2020), Issue 3 (September)
https://cemse.kaust.edu.sa/tcns/volume-7-2020-issue-3-september

**Papers:**

p. 1547

- Robust Event-Triggered Dynamic Average Consensus Against Communication Link Failures With Application to Battery Control

L. Xing, Q. Xu, C. Wen, Y.-C. Tian, Y. Mishra, G. Ledwich, and Y. Song

p. 1559

- Trajectory Optimization of Autonomous Agents With Spatio-Temporal Constraints

X. Meng and C. G. Cassandras

p. 1571

The table of contents of this IEEE TCNS issue is available on:

https://cemse.kaust.edu.sa/tcns/volume-7-2020-issue-3-september

### 1.8. IEEE CSS Outreach Fund: Fall Solicitation
Contributed by: Antonella Ferrara, antonella.ferrara@unipv.it

IEEE Control Systems Society (CSS) Outreach Fund Fall Solicitation

The IEEE Control Systems Society (CSS) Outreach Fund provides grants for projects that will benefit CSS members and the control community in general. Since its inception in 2011, the Fund has funded 81 grants on behalf of a diverse group of CSS member-led activities.

The CSS Outreach Task Force is pleased to announce that the window for proposal submission for its 2020 fall solicitation will be held from **November 1 to 22, 2020**.

The maximum amount that can be requested for an Outreach project has recently been increased to **$20K**.

Because of the time needed for grant approval and processing, any CSS member interested in pursuing an Outreach-funded project starting in the second semester of 2021 needs to apply during this solicitation.

Information regarding the program, which includes proposal requirements descriptions, a list of current and past funded projects, and an informative 10-minute video overview can be found in:

IEEE Control Systems Society Outreach Fund

The CSS Outreach Fund is also featured in an article appearing in the August 2019 issue of the Control Systems Magazine:

The CSS Outreach Fund - August 2019 issue of the Control Systems Magazine

Inquiries, notices of intent, and requests for application materials must be made directly to Antonella Ferrara, Outreach Task Force Chair, at antonella.ferrara@unipv.it.

### 1.9. CDC 2020 Online Program, South Korea
Contributed by: Hideaki Ishii, ishii@c.titech.ac.jp

IEEE Conference on Decision and Control, Republic of Korea
59th IEEE Conference on Decision and Control, December 14-18, 2020 Jeju Island, Republic of Korea
http://cdc2020.ieeecss.org
Join us at the first virtual CDC!

The online program can be found at
https://css.paperplaza.net/conferences/conferences/CDC20/program/.

The virtual program will be held over 5 days, with 4.5 hours per day, scheduled to start at 13:00 (1:00 pm) Coordinated Universal Time (UTC), which is one week later than was originally planned. The virtual sessions schedule will comprise 17 parallel tracks including Tutorial Sessions and COVID-19 Focus Sessions. The regular and invited sessions comprise 15-minute slots for the presentation video and the Q&A live session.

Bode Lecture, Plenary and Semi-Plenary Lectures: The Bode Lecture will be presented by Kristin Y. Pettersen, Norwegian University of Science and Technology, Norway. The plenary lecture will be delivered by Stephen P. Boyd, Stanford University, USA. The semi-plenary speakers will be Murat Arcak, University of California, Berkeley, USA; Franco Blanchini, University of Udine, Italy; Shinji Hara, Tokyo Institute of Technology, Japan; and Jonathan P. How, Massachusetts Institute of Technology, USA.

Workshops: A number of pre-conference workshops will be offered on Saturday and Sunday, December 12-13, 2020 during the same hours as the conference:

Two-day Workshops, 1-5 pm UTC, December 12 & 13 (Sat & Sun)

T1. Advanced Battery Management: Recent Advances and Future Innovations
T2. Real time NMPC: From Fundamentals to Industrial Applications
T3. Data-driven Control
T4. Dynamics in Social and Economic Networks
T5. Non-linear and adaptive control: A tribute to Laurent Praly for his 65th birthday

One-day Workshops, 1-5 pm UTC, December 13 (Sun)

O1. Control, Optimization, and Learning Methods for Emerging Mobility Systems
O2. Compressed Sensing and Sparse Representation for Systems and Control
O3. Learning and Security for Multi-Agent Systems

Registration: Currently, conference registration can still be made at much reduced rates than originally planned due to going virtual. The first category includes paper uploads. The second category, newly introduced for the virtual CDC, does not include paper uploads and is available at rates even further reduced. Both categories include access to the virtual venue, electronic proceedings, live sessions, and on-demand

presentations. For details, please visit the conference website.

General Chairs
Richard D. Braatz, Massachusetts Institute of Technology, USA
Chung Choo Chung, Hanyang University, Republic of Korea

Advisor
Dong-il Dan Cho, Seoul National University, Republic of Korea

Program Chairs
Jay H. Lee, KAIST, Republic of Korea
Luca Zaccarian, LAAS-CNRS, France, University of Trento, Italy

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# 2    Miscellaneous

**2.1.  Spring School on Data-driven Model Learning for Dynamic Systems**
Contributed by: Guillaume Mercère, guillaume.mercere@univ-poitiers.fr

2021 Spring School on Data-driven Model Learning for Dynamic Systems
Virtual Edition, 6-9 April 2021

Due to the coronavirus pandemic, the fourth edition of the doctoral school in data-based modeling (system identification) will be organized in a fully virtual fashion. This school (sponsored by the GDR MACS) consists of a series of lectures and of exercise sessions aiming at covering the fundamentals of data-driven modeling approaches as well as more advanced topics. The course is eligible for scientific doctoral modules. The school is thus mainly aimed at an audience of PhD students, but is also open to any other persons interested in the topic of data-based modeling.

The 2021-edition will have the honour to welcome Professor Van den Hof (TU Eindhoven, Pays-Bas) that will present a one-day course entitled: *Dynamic Network Identification*

More information on this doctoral school (registration fees, . . . ) can be found at the following link:
https://spring-id-2021.sciencesconf.org/

The deadline for registration is 31 January 2021.

**2.2.  Balakrishnan Awards for Excellence in Scientific Research**
Contributed by: Petros Ioannou, ioannou@usc.edu

Nomination Call for the A.V. 'Bal' Balakrishnan Awards for Excellence in Scientific Research in the Mathematics of Systems

This is a call for nomination of candidates for the new A.V. 'Bal' Balakrshnan Awards for Excellence in Scientific Research in the Mathematics of Systems established at the Viterbi School of Engineering at the University of Southern California.

A.V. 'Bal' Balakrishnan Awards: The A.V. 'Bal' Balakrishnan Award for Excellence in Scientific Research in the Mathematics of Systems was established by the Viterbi School of Engineering at the University of Southern California (USC) through a generous gift from Mrs. Sophia Balakrishnan honoring the memory of her late husband Professor A. V. 'Bal' Balakrishnan, a well-known researcher and Professor in the area of the Mathematics of Systems. There are two awards, an Early Career Award and a Research Award, alternating every other year, with the Early Career Award awarded in odd-numbered years and the Research Award in even-numbered years.
Award Areas: Nominees are expected to have made significant contributions in the general area of the Mathematics for Systems which covers a variety of Engineering and Applied Math topics, including but not limited to Controls, Communications, Aerodynamics, Mechanics, Signals, and other related fields. Emphasis will be given on research topic areas in which Professor A.V. 'Bal' Balakrishnan worked.

Early Career Award: Given for research work that has been done within 10 years of the awardee's PhD. The award is based on the work's potential and promise, as well as the researcher's career accomplishments or contributions to the field. The Early Career Award carries an honorarium of $5,000. The Awardee will be required to give a lecture at USC in order to receive the award. The lecture event will be hosted by the USC Viterbi School of Engineering.

Research Award: This award recognizes outstanding research in any of the areas of interest, as specified below. Also eligible for the award are exceptional researchers in the industry or government. The Research Award carries an honorarium of $10,000. The Awardee will be required to give a lecture at USC in order to receive the award. The lecture event will be hosted by the USC Viterbi School of Engineering.

Deadlines for Nomination and References
Early Career Award Before January 10, 2021
Research Award Before January 10, 2022

For nomination forms and further information visit
https://sites.usc.edu/balakrishnan-library/awards/

For further Information contact: ioannou@usc.edu

### 2.3. IFAC Activity Fund
Contributed by: Paul Goulart, paul.goulart@eng.ox.ac.uk

The IFAC Activity Fund invites applications for financial support of initiatives that foster and promote public engagement with the control engineering community. The fund sponsors initiatives that:
- Maximize control engineering community engagement;
- Promote inclusion and diversity in alignment with the IFAC guidelines;
- Increase control engineering influence in public discourse and decision-making.

Financial assistance of Euro 5,000 is provided to activity organisers. Applications will be sought twice a year. A committee of five members from different geographical regions and technical backgrounds administers the fund. The next application deadline is the 15th of October 2020. For more information, email activityfund@ifac-control.org.

### 2.4. European Control Award
Contributed by: Paul Goulart, paul.goulart@eng.ox.ac.uk

The European Control Award (ECA) is to recognize outstanding contributions by a young researcher in the area of systems and control. The award is sponsored by the European Control Association (EUCA), and will be presented during the annual European Control Conference. The recipient will give a plenary lecture during the final day of the ECC.

Details of this award and the nomination procedure can be found at https://euca-ecc.org/eca.html

The deadline for nominations for the European Control Award is November 30th, 2020.

### 2.5. Asian Journal of Control Kimura Best Paper Award
Contributed by: Li-Chen Fu, lichen@ntu.edu.tw

Asian Journal of Control: 3rd Kimura Best Paper Award

Asian Journal Control has been holding the Asian Journal of Control Best Paper Award since 2001. The Award aims to recognize papers that have distinguished contribution and innovation in the field of control science and engineering. Starting from 2018, with the generous donation from Prof. Hidenori Kimura, we have decided to re-name the award as Kimura Best Paper Award.

We are pleased to announce that the awardee of 3rd Kimura Best Paper Award of Asian Journal of Control is:

- Paper title: Feature-based Recursive Observer Design for Homography Estimation and its Application to Image Stabilization
- Authors: Minh-Duc Hua, Jochen Trumpf, Tarek Hamel, Robert Mahony, Pascal Morin
- Vol. 21, No. 4, pp. 1443–1458, July 2019
- DOI: 10.1002/asjc.2012
- URL: https://onlinelibrary.wiley.com/doi/full/10.1002/asjc.2012
- Abstract: This paper presents a new algorithm for online estimation of a sequence of homographies applicable to image sequences obtained from robotic vehicles equipped with vision sensors. The approach taken exploits the underlying Special Linear group structure of the set of homographies along with gyroscope measurements and direct point-feature correspondences between images to develop temporal filter for the homography estimate. Theoretical analysis and experimental results are provided to demonstrate the robustness of the proposed algorithm. The experimental results show excellent performance and robustness even in the case of very fast camera motions (relative to frame rate) and severe occlusions.

### 2.6. International Graduate School on Control
Contributed by: Antoine Girard, antoine.girard@l2s.centralesupelec.fr

2021 International Graduate School on Control (EECI-IGSC-2021)
http://www.eeci-igsc.eu/

The EECI-IGSC-2021 will be proposing 22 independent courses to be held between February and July 2021. The deadline for early registration to the modules M01 to M09 is 12 January 2021 and to the modules M10 to M22 is 28 March 2021.

Program:

M01: ZURICH: 01/02/2021-05/02/2021
Learning-Based Predictive Control

Melanie Zeilinger, ETH Zurich, Switzerland; Lorenzo Fagiano, Politecnico di Milano, Italy; Lukas Hewing, ETH Zurich, Switzerland

M02: ONLINE: 08/02/2021-12/02/2021
From Data to Decisions: the Scenario Approach (with Applications to Systems, Control and Machine Learning)
Marco C. Campi, University of Brescia, Italy; Simone Garatti, Politecnico di Milano, Italy

M03: PARIS-SACLAY: 22/02/2021-26/02/2021
Nonsmooth Dynamical Systems: Analysis, Applications, Stability and Control
Bernard Brogliato, INRIA, Grenoble, France; Aneel Tanwani, CNRS LAAS, Toulouse, France

M04: MUNICH: 08/03/2021-12/03/2021
Model-Based Fault Diagnosis - a Linear Synthesis Framework using MATLAB
Andreas Varga, Gilching, Germany; Daniel Ossmann, Univ. of Applied Sciences, Munich, Germany

M05: AACHEN: 15/03/2021-19/03/2021
Networked Model Predictive Control for Multi-Vehicle Decision-Making
Bassam AlIrifaee, RWTH Aachen University, Germany

M06: MONTERREY, MX: 22/03/2021-26/03/2021
Energy-Based Control Design to Face the Challenges of Future Power Systems
Romeo Ortega, ITAM, Mexico; Johannes Schiffer, Brandenburg Univ. Tech., Germany

M07: L'AQUILA: 29/03/2021-02/04/2021
Stochastic Models in Systems & Synthetic Biology
Alessandro Borri, CNR-IASI Biomathematics Lab, Rome, Italy; Pasquale Palumbo, University of Milano-Bicocca, Italy; Abhyudai Singh, University of Delaware, USA

M08: PARIS-SACLAY: 12/04/2021-16/04/2021
Equivariant Systems Theory and Observer Design for Autonomous Systems
Robert Mahony & Jochen Trumpf, Australian Nat. Univ., Australia; Tarek Hamel, CNRS Sophia-Antipolis, France

M09: MADRID: 19/04/2021-23/04/2021
Constrained Discrete Optimal Control on Lie Groups
Debasish Chatterjee & Ravi Banavar, IIT Bombay, India

M10: L'AQUILA: 26/04/2021-30/04/2021
LMIs for Optimization and Control
Didier Henrion, CNRS LAAS, Toulouse, France

M11: LAUSANNE: 03/05/2021-07/05/2021
Learning to Control

Simone Formentin, Politecnico di Milano, Italy

M12: TOULOUSE: 03/05/2021-07/05/2021
Sparsity and Big Data in Control, Systems Identification and Machine Learning
Mario Sznaier, Northeastern Univ., USA

M13: STOCKHOLM: 17/05/2021-21/05/2021
Formal Methods in Control Design - from Discrete Synthesis to Continuous Controllers
Calin A. Belta, Boston University, USA; Antoine Girard, CNRS L2S, Univ. Paris-Saclay, France

M14: PARIS-SACLAY: 25/05/2021-28/05/2021
High-Gain Observers in Nonlinear Feedback Control
Hassan K. Khalil, Michigan State University, USA

M15: PARIS-SACLAY: 31/05/2021-04/06/2021
Dynamics and Algorithms on Networks
Julien Hendrickx, UC Louvain, Belgium; Alex Olshevsky, Boston University, USA

M16: PARIS-SACLAY: 07/06/2021-11/06/2021
Multi-Agent Distributed Optimization and Learning over Wireless Networks
Luca Schenato & Ruggero Carli, Università di Padova, Italy

M17: MARSEILLE: 07/06/2021-11/06/2021
Introduction to Discrete Event Systems
Stephane Lafortune, University of Michigan, USA; Christos Cassandras, Boston University, USA

M18: PARIS-SACLAY: 14/06/2021-18/06/2021
Predictive and Optimization Based Control for Automotive and Aerospace Applications
Stefano Di Cairano, Mitsubishi Res. Lab Boston, USA; Ilya Kolmanovsky, University of Michigan, USA

M19: PISA: 21/06/2021-25/06/2021
Neuromorphic Control Principles
Guillaume Drion, Univ. Liège, Belgium; Alessio Franci, UNAM, Mexico; Rodolphe Sepulchre, Univ. Cambridge, UK

M20: HONG-KONG: 21/06/2021-25/06/2021
Optimization and Machine Learning in Control
Xiaoming Yuan, University of Hong Kong; Enrique Zuazua, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

M21: LUCCA: 28/06/2021-02/07/2021
Hybrid Control Design
Ricardo Sanfelice, University of California at Santa Cruz, USA

M22: ROME: 05/07/2021-09/07/2021

Dynamic Control Allocation

Sergio Galeani & Mario Sassano, Univ. Rome "Tor Vergata", Italy; Andrea Serrani, Ohio State University, USA

Course summaries and registration information will soon be available at http://www.eeci-igsc.eu/

# 3 Books

### 3.1. Reinforcement Learning and Optimal Control
Contributed by:, Dimitri Bertsekas

D. P. Bertsekas, Reinforcement Learning and Optimal Control, Athena Scientific, 2019

The purpose of the book is to consider large and challenging multistage decision problems, which can be solved in principle by dynamic programming and optimal control, but their exact solution is computationally intractable. We discuss solution methods that rely on approximations to produce suboptimal policies with adequate performance. These methods are collectively referred to as reinforcement learning, and also by alternative names such as approximate dynamic programming, and neuro-dynamic programming.

Our subject has benefited enormously from the interplay of ideas from optimal control and from artificial intelligence. One of the aims of this monograph is to explore the common boundary between these two fields and to form a bridge that is accessible by workers with background in either field.

The mathematical style of the book is somewhat different from the author's dynamic programming books, and the neuro-dynamic programming monograph, written jointly with John Tsitsiklis. We rely more on intuitive explanations and less on proof-based insights. Still we provide a rigorous short account of the theory of finite and infinite horizon dynamic programming, and some basic approximation methods, in an appendix. For this we require a modest mathematical background: calculus, elementary probability, and a minimal use of matrix-vector algebra.

The methods of this book have been successful in practice, and often spectacularly so, as evidenced by recent amazing accomplishments in the games of chess and Go. However, across a wide range of problems, their performance properties may be less than solid. This is a reflection of the state of the art in the field: there are no methods that are guaranteed to work for all or even most problems, but there are enough methods to try on a given challenging problem with a reasonable chance that one or more of them will be successful in the end. Accordingly, we have aimed to present a broad range of methods that are based on sound principles, and to provide intuition into their properties, even when these properties do not include a solid performance guarantee. Hopefully, with enough exploration with some of these methods and their variations, the reader will be able to address adequately his/her own problem.

For preface, table of contents, and supplementary material see
http://web.mit.edu/dimitrib/www/RLbook.html

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### 3.2. Rollout, Policy Iteration, and Distributed Reinforcement Learning
Contributed by: Dimitri Bertsekas, dimitrib@mit.edu

D. P. Bertsekas, Rollout, Policy Iteration, and Distributed Reinforcement Learning, Athena Scientific, 2020

This is a research monograph at the forefront of research on reinforcement learning, also referred to by other names such as approximate dynamic programming and neuro-dynamic programming. It focuses

on the fundamental idea of policy iteration, i.e., start from some policy, and successively generate one or more improved policies. If just one improved policy is generated, this is called rollout, which, based on broad and consistent computational experience, appears to be one of the most versatile and reliable of all reinforcement learning methods. Among others, it can be applied on-line using easily implementable simulation, and it can be used for discrete deterministic combinatorial optimization, as well as for stochastic Markov decision problems.

Approximate policy iteration is more ambitious than rollout, but it is a strictly off-line method, and it is generally far more computationally intensive. This motivates the use of parallel and distributed computation. One of the purposes of the monograph is to discuss distributed (possibly asynchronous) methods that relate to rollout and policy iteration, both in the context of an exact and an approximate implementation involving neural networks or other approximation architectures. Several of the ideas that we develop in some depth in this monograph have been central in the implementation of recent high profile successes, such as the AlphaZero program for playing chess, Go, and other games. In addition to the fundamental process of successive policy iteration/improvement, this program includes the use of deep neural networks for representation of both value functions and policies, the extensive use of large scale parallelization, and the simplification of lookahead minimization, through methods involving Monte Carlo tree search and pruning of the lookahead tree. In this monograph, we also focus on policy iteration, value and policy neural network representations, parallel and distributed computation, and lookahead simplification. Thus while there are significant differences, the principal design ideas that form the core of this monograph are shared by the AlphaZero architecture, except that we develop these ideas in a broader and less application-specific framework.

Among its special features, the book:

a) Presents new research relating to distributed asynchronous computation, partitioned architectures, and multiagent systems, with application to challenging large scale optimization problems, such as combinatorial/discrete optimization, as well as partially observed Markov decision problems.
b) Describes variants of rollout and policy iteration for problems with a multiagent structure, which allow a dramatic reduction of the computational requirements for lookahead minimization.
c) Establishes a connection of rollout with model predictive control, one of the most prominent control system design methodologies.
d) Expands the coverage of some research areas discussed in 2019 textbook Reinforcement Learning and Optimal Control by the same author.

For more information, preface, table of contents, and related material:
http://web.mit.edu/dimitrib/www/dpchapter.html

### 3.3. Foundations of Average-Cost Nonhomogeneous Controlled Markov Chains
Contributed by: Laura Burgess, laura.burgess@springer.com

Foundations of Average-Cost Nonhomogeneous Controlled Markov Chains by Xi-Ren Cao
ISBN: 978-3-030-56677-7
September 2020, Springer

Softcover, 120 pages, $59.99/€51,99
https://www.springer.com/gb/book/9783030566777

This Springer brief addresses the challenges encountered in the study of the optimization of time nonhomogeneous Markov chains. It develops new insights and new methodologies for systems in which concepts such as stationarity, ergodicity, periodicity and connectivity do not apply. This brief introduces the novel concept of confluencity and applies a relative optimization approach. It develops a comprehensive theory for optimization of the long-run average of time-nonhomogeneous Markov chains. The book shows that confluencity is the most fundamental concept in optimization, and that relative optimization is more suitable for treating the systems under consideration than standard ideas of dynamic programming. Using confluencity and relative optimization, the author classifies states as confluent or branching and shows how the under-selectivity issue of the long-run average can be easily addressed, multi-class optimization implemented, and Nth biases and Blackwell optimality conditions derived. These results are presented in a book for the first time and so may enhance the understanding of optimization and motivate new research ideas in the area.

**Contents:**

1. Introduction
2. Confluencity and State Classification
3. Optimization of Average Rewards and Bias: Single Class
4. Optimization of Average Rewards: Multi-Chains
5. The Nth-Bias and Blackwell Optimality

### 3.4. Dynamic Biosystem Modeling and Simulation Methodology
Contributed by: Joseph DiStefano III, joed@cs.ucla.edu

New textbook and Course (CS-BE M182) at UCLA: "Dynamic Biosystem Modeling & Simulation Methodology – Integrated & Accessible"

Link: https://amzn.to/3jjlXYr

This uniquely crafted textbook is primarily for use in teaching undergraduate students in the life, math, computer and other sciences & engineering. It is introductory level, for students who have taken or are currently completing their undergraduate math requirements, along with introductory biology, chemistry and physics subject matter. It's about learning HOW to model and simulate dynamic biological systems, and WHAT biological features to model, which also makes it useful for graduate students and professional researchers who'd like to see a more rigorous treatment of introductory life science math modeling, integrated with the biology. The primary goal is to develop accessible and useful modeling formalisms, first using morphological ideas – form and mechanistic structure.

Then it moves on to more abstract modeling paradigms (block diagrams, directed graphs, etc), and at the same time to the math and computer simulation methods needed to express them quantitatively – a likely first exposure to "explicit and integrated biomodeling" for life science students in particular. This

new textbook brings together the multidisciplinary pedagogy of these subjects into a single introductory modeling methodology course, crystalizing the experience of an author who has been teaching dynamic biosystems modeling and simulation methodology for the life sciences for more than 50 years. In designing it, his second on the subject, he maximizes accessibility and "systems-math-biology" integration – without diminishing conceptual rigor. Minimally essential applied math and systems engineering methods are included, along with a synopsis of the biology and physiology underlying dynamic biosystem modeling, all in a modeling pedagogy context. It is a selectively filtered, reorganized and integrated version of the subject, accessible to life science sophomores and other entry-level students in bioengineering, computer science, math and other interdisciplinary programs. This book fills a major need in the training of contemporary biology students. The essence of systems modeling methodology is largely qualitative; and the author has managed to extract this essence, over 12 distinctive chapters, by pruning, rearranging and reorganizing the topics and his approach to teaching them – primarily with simple differential equations and algebra for expressing them quantitatively, integrated with the biology.

Solving and analyzing the biomodels are then accomplished by simulation, using control system simulation language SIMULINK, rather than by "coding" the model in a standard computer programming language. Students see and work with the system model – not the code – a big plus. Higher math and complex analytical solutions are avoided. Each chapter begins with a list of LEARNING GOALS, to help with both perspective for the chapter material, and retrospective, to measure learning. Exercises for the student at the end of each chapter are designed to test and reinforce learning. A SOLUTIONS MANUAL for chapter exercises is available to qualified instructors from the author, as are LECTURE SLIDES and LAB ASSIGNMENTS and SOLUTIONS, for courses that adopt the textbook for student use. Although the layout and pacing of the chapters is ideal for motivated undergraduates, it includes useful definitions and clear explanations of so many fundamental terms and concepts that it can serve as a facile reference guide for professional researchers, graduate and other students at more advanced levels.

This softcover book is available on AMAZON in two versions, a full-color-learning-enhanced edition and a less expensive – but otherwise complete – black-and-white (greyscale) edition.

# 4 Journals

## 4.1. Systems & Control Letters
Contributed by: Lusia Veksler, lveksler@ucsd.edu

Systems & Control Letters
Volume 143, September 2020

**Papers:**

- Identification of port-Hamiltonian systems from frequency response data, Peter Benner, Pawan Goyal, Paul Van Dooren, Article 104741
- Linear quadratic regulation for discrete-time systems with input delay and colored multiplicative noise, Hongdan Li, Juanjuan Xu, Huanshui Zhang, Article 104740
- The stability with general decay rate of neutral stochastic functional hybrid differential equations with Lévy noise, Guangjun Shen, Wentao Xu, Dongjin Zhu, Article 104742
- Value iteration algorithm for mean-field games, Berkay Anahtarcı, Can Deha Karıksız, Naci Saldi, Article 104744
- Stability properties of multi-stage nonlinear model predictive control, Sergio Lucia, Sankaranarayanan Subramanian, Daniel Limon, Sebastian Engell, Article 104743
- Adaptive nonlinear control with constrained parallel parameter estimates, Patrizio Tomei, Riccardo Marino, Article 104739
- On optimal design of experiments for static polynomial approximation of nonlinear systems, P. Schrangl, L. Giarré, Article 104758

## 4.2. Information and Inference: A Journal of the IMA
Contributed by: Hannah Cherry, hannah.cherry@oup.com

Information and Inference: A Journal of the IMA
Links to all articles in the issue are available online at:
https://academic.oup.com/imaiai/issue/9/3

**Papers:**

- Phase transitions of spectral initialization for high-dimensional non-convex estimation
Yue M Lu, Gen Li
- Quantized compressive sensing with RIP matrices: the benefit of dithering
Chunlei Xu, Laurent Jacques
- Maximum number of modes of Gaussian mixtures
Carlos Améndola, Alexander Engström, Christian Haase
- One-bit compressed sensing with partial Gaussian circulant matrices
Sjoerd Dirksen, Hans Christian Jung, Holger Rauhut
- On the S-instability and degeneracy of discrete deep learning models
Andee Kaplan, Daniel J Nordman, Stephen B Vardeman

- Quantifying the estimation error of principal component vectors
Raphael Hauser, Jüri Lember, Heinrich Matzinger, Raul Kangro
- Two-sample statistics based on anisotropic kernels
Xiuyuan Cheng, Alexander Cloninger, Ronald R Coifman
- Phase harmonic correlations and convolutional neural networks
Stéphane Mallat, Sixin Zhang, Gaspar Rochette

### 4.3. International Journal of Control, Automation, and Systems
Contributed by: Keum-Shik Hong, journal@ijcas.com

Vol. 18, No. 10, October 2020

**Papers:**

- Reachable Set Estimation for Uncertain Linear Systems with Known Inputs, Zhihao Zhang, Xinsheng Wang, Wenbo Xie, Xin Zhang*, and Yi Shen, pp.2445-2455
- PID Principles to Obtain Adaptive Variable Gains for a Bi-order Sliding Mode Control, Sergio Alvarez-Rodríguez* and Gerardo Flores, pp.2456-2467
- Distributed Coordination of Heterogeneous Multi-agent Systems with Dynamic Quantization and L2-L-Infinity Control, Shixun Xiong*, Qingxian Wu, and Yuhui Wang, pp.2468-2481
- Event-based Adaptive Output Feedback Prescribed Performance Control for a Class of Switched Nonlinear Systems with Unknown Control Directions, Chunyan Wang*, Mengqi Zhang, Huan Li, and Na Wang, pp.2482-2491
-Fuzzy Adaptive Fixed-time Sliding Mode Control with State Observer for A Class of High-order Mismatched Uncertain Systems, Ali Soltani Sharif Abadi*, Pooyan Alinaghi Hosseinabadi, and Saad Mekhilef, pp.2492-2508
- Design and Performance Validation of Integrated Navigation System Based on Geometric Range Measurements and GIS Map for Urban Aerial Navigation, Gwangsoo Park, Byungjin Lee, Dong Gyun Kim, Young Jae Lee, and Sangkyung Sung*, pp.2509-2521
- A GPC-based Multi-variable PID Control Algorithm and Its Application in Anti-swing Control and Accurate Positioning Control for Bridge Cranes, Bin Yang*, Zhenxing Liu, Huikang Liu, Yan Li, and Sen Lin, pp.2522-2533
- Distributed Optimization over General Directed Networks with Random Sleep Scheme, Zheng Wang, Lifeng Zheng*, and Huaqing Li*, pp.2534-2542
- Improved LMI Conditions for Unknown Input Observer Design of Discrete-time LPV Systems, Matheus Senna de Oliveira* and Renan Lima Pereira, pp.2543-2551

- Event-triggered Control for Linear Systems with Model Uncertainty and Clock Offset, Xiang-hua Jiang and Qiang Ling*, pp.2552-2561

- Event-based Finite-time Boundedness of Discrete-time Network Systems, Yingqi Zhang*, Miaojun Zhan, Yan Shi, and Caixia Liu, pp.2562-2571

- Secure Control of Networked Switched Systems with Random DoS Attacks via Event-triggered Approach, Yonghui Liu, pp.2572-2579

- Adaptive Event-triggered Control for Networked Switched T-S Fuzzy Systems Subject to False Data Injection Attacks, Yiwen Qi*, Shuo Yuan, and Xin Wang, pp.2580-2588

- Distributed Control for Uncertain Nonlinear Multiagent Systems Subject to Hybrid Faults, Changchun Hua*, Zhijie Li, Kuo Li, Shuzong Chen, and Jie Sun, pp.2589-2598

- Pinning Synchronization of Stochastic T-S Fuzzy Delayed Complex Dynamical Networks with Heterogeneous Impulsive Delays, Huilan Yang, Lan Shu, Shouming Zhong, Tao Zhan, and Xin Wang*, pp.2599-2608

- Fast and Accurate Self-calibration Using Vanishing Point Detection in Manmade Environments, Sang Jun Lee and Sung Soo Hwang*, pp.2609-2620

- Output Feedback Adaptive Control for Stochastic Non-strict-feedback System with Dead-zone, Yumei Sun*, Bingwei Mao, Hongxia Liu, and Shaowei Zhou, pp.2621-2629

- Liquid Level Tracking Control of Three-tank Systems, Shuyou Yu*, Xinghao Lu, Yu Zhou, Yangyang Feng, Ting Qu, and Hong Chen, pp.2630-2640

- Iterative Learning Model Predictive Control Approaches for Trajectory Based Aircraft Operation with Controlled Time of Arrival, Gaoyang Jiang* and Zhongsheng Hou, pp.2641-2649

- Semi-automatic Knob System for Assisting Flexible Endoscope Steering, Hyun-Soo Yoon and Byung-Ju Yi*, pp.2650-2657

- Robotic Path Planning Based on a Triangular Mesh Map, Yanbin Liu and Yuanyuan Jiang*, pp.2658-2666

- Embedded Haptic Device Implementation for Soft Tissue Rendering, Humiko Yahaira Hernández Acosta*, Alejandro Miranda Cid, Alejandro Tonatiu Velázquez Sánchez, Mario Ramírez Neria, and Guillermo Manuel Urriolagoitia Calderón, pp.2667-2677

- Development of a Soft Exosuit System for Walking Assistance During Stair Ascent and Descent, Hee Don Lee*, Heejin Park, Bak Seongho, and Tae Hun Kang*, pp.2678-2686

- A Probabilistic Model-adaptive Approach for Tracking of Motion with Heightened Uncertainty, J. Josiah Steckenrider* and Tomonari Furukawa, pp.2687-2698

- Robust Place Recognition Using Illumination-compensated Image-based Deep Convolutional Autoencoder Features, Chansoo Park, Hee-Won Chae, and Jae-Bok Song*, pp.2699-2707

### 4.4. International Journal of Applied Mathematics and Computer Science
Contributed by:, amcs@uz.zgora.pl

Website: www.amcs.uz.zgora.pl

E-mail: amcs@uz.zgora.pl

Scope: modern control theory and practice; artificial intelligence methods and their applications; applied mathematics and mathematical optimisation techniques; mathematical methods in engineering, computer science, and biology

Indexation: ACM Digital Library, Applied Mechanics Reviews, Current Mathematical Publications (AMS), DBLP Computer Science Bibliography, EBSCO, Elsevier, Google Scholar, Inspec, Mathematical Reviews (MathSciNet), ProQuest, Clarivate Analytics (formerly Thomson Reuters), Zentralblatt Math, and others.

Impact Factor: 0.967 (2019) / 5-Year IF: 1.105 (2019)

**Special Section Papers:**

**Regular Section Papers:**

### 4.5. IMA Journal of Mathematical Control and Information
Contributed by: Hannah Cherry, hannah.cherry@oup.com

IMA Journal of Mathematical Control and Information

Links to all articles in this issue are available below and online at:

https://academic.oup.com/imamci/issue/37/3

**Papers:**

- Multi-dimensional Taylor network modelling and optimal control of SISO nonlinear systems for tracking by output feedback
Qi-Ming Sun, Hong-Sen Yan
https://academic.oup.com/imamci/article/37/3/699/5536465
- Stochastic boundedness of state trajectories of stable LTI systems in the presence of non-vanishing stochastic perturbation
Peyman Azodi, Peyman Setoodeh, Alireza Khayatian, Elham Jamalinia
https://academic.oup.com/imamci/article/37/3/718/5553675
- On the exact modelling of linear systems
Georgia G Pechlivanidou, Nicholas P Karampetakis
https://academic.oup.com/imamci/article/37/3/730/5553670
- Boundary output feedback stabilization of transport equation with non-local term
Liping Wang, Feng-Fei Jin
https://academic.oup.com/imamci/article/37/3/752/5560307
- Finite-time terminal synergetic control of a class of nonlinear systems with unmatched uncertainties
Azadeh Ahifar, Abolfazl Ranjbar Noei, Zahra Rahmani
https://academic.oup.com/imamci/article/37/3/765/5480293
- Controllability criteria of fractional differential dynamical systems with non-instantaneous impulses
B Sundara Vadivoo, R Raja, Jinde Cao, G Rajchakit, Aly R Seadawy
https://academic.oup.com/imamci/article/37/3/777/5587442
- Data-sampling controllability of multi-agent systems
Bin Zhao, Yongqiang Guan
https://academic.oup.com/imamci/article/37/3/794/5587445
- Finite-time stabilization of stochastic coupled systems on networks by feedback control and its application
Yongbao Wu, Wenxue Li, Jiqiang Feng
https://academic.oup.com/imamci/article/37/3/814/5614269
- Input–output linearization of non-linear time-varying delay systems: the single-input single-output case
Ihab Haidar, Florentina Nicolau, Jean-Pierre Barbot, Woihida Aggoune
https://academic.oup.com/imamci/article/37/3/831/5625675
- Robust regional stabilization for the two-dimensional mixed continuous-discrete-time Roesser models
Xiang Ren, Fei Hao
https://academic.oup.com/imamci/article/37/3/855/5625678
- Control of bounded solutions for first-order singular differential equations with impulses
Fanchao Kong, Juan J Nieto
https://academic.oup.com/imamci/article/37/3/877/5628041
- Asymptotic stabilization for a wave equation with periodic disturbance

Jing Wei, Hongyinping Feng, Bao-Zhu Guo

https://academic.oup.com/imamci/article/37/3/894/5644303

- Event-triggered H-Infinity control for NCS with time-delay and packet losses

Jing Bai, Ying Wang, Li-Ying Zhao

https://academic.oup.com/imamci/article/37/3/918/5640431

- Cooperative optimal control for descriptor multi-agent systems

Liping Zhang, Guoshan Zhang

https://academic.oup.com/imamci/article/37/3/935/5651191

- Iterative-learning procedures for nonlinear-model-order reduction in discrete time

Salim Ibrir

https://academic.oup.com/imamci/article/37/3/953/5673268

- A weak maximum principle for optimal control problems with mixed constraints under a constant rank condition

Roberto Andreani, Valeriano Antunes de Oliveira, Jamielli Tomaz Pereira, Geraldo Nunes Silva

https://academic.oup.com/imamci/article/37/3/1021/5722300

### 4.6. IET Control Theory & Applications
Contributed by: Faraz Alam, farazalam@theiet.org

IET Control Theory & Applications

Volume 14, Issue 15

https://digital-library.theiet.org/content/journals/iet-cta/14/15

**Research Articles:**

- Fanglai Zhu ; Yu Shan ; Jiancheng Zhang ; Fengning Wang , Observer-based fault reconstructions and fault-tolerant control designs for uncertain switched systems with both actuator and sensor faults , DOI: 10.1049/iet-cta.2019.1051

- Weizhong Chen ; Yang Zhang ; Yelei Zheng , Dissipativity of Markovian multiple-weighted coupled neural networks with dynamic event-triggered pinning control , DOI: 10.1049/iet-cta.2020.0046

- Peng Cheng and Chenxiao Cai , Fault detection for a class of uncertain Lipschitz systems with time delays in finite-frequency domain , DOI: 10.1049/iet-cta.2019.1326

- Shaohang Yu ; Chengfu Wu ; Jia-Nan Wu ; Liang Wang , Stability and stabilisation of heterogeneous switched systems with arbitrary switching constraints , DOI: 10.1049/iet-cta.2019.0853

- Rohit V. Nanavati ; Shashi Ranjan Kumar ; Arnab Maity , Suboptimal closed-form feedback control of input-affine non-linear systems, DOI: 10.1049/iet-cta.2019.1249

- Wenjie Mei ; Chengyan Zhao ; Masaki Ogura ; Kenji Sugimoto , Mixed H2/H-Infinity control of delayed Markov jump linear systems , DOI: 10.1049/iet-cta.2019.1162

- Shida Liu ; Zhongsheng Hou ; Xin Zhang ; Honghai Ji , Model-free adaptive control method for a class of unknown MIMO systems with measurement noise and application to quadrotor aircraft , DOI: 10.1049/iet-cta.2020.0073

- Xuan Xiao ; Kai Shen ; Yuan Liang ; Tingxin Liu , Kalman filter with recursive covariance estimation for protection against system uncertainty , DOI: 10.1049/iet-cta.2019.1476

- Sandeep Kumar Soni ; Shyam Kamal ; Sandip Ghosh , Delayed output feedback sliding mode control for uncertain non-linear systems , DOI: 10.1049/iet-cta.2020.0269
- Ling Huang ; Xiaona Lin ; Beibei Zhong ; Donghao Xu , Robust H-Infinity control for one-sided Lipschitz non-linear systems with time-varying delays and uncertainties , DOI: 10.1049/iet-cta.2019.1461
- Xuxi Zhang ; Wenyan Han ; Xianping Liu , Bipartite tracking consensus of linear multi-agent systems with a dynamic leader under signed digraph , DOI: 10.1049/iet-cta.2020.0353
- Pushkar Prakash Arya and Sohom Chakrabarty , Robust internal model controller with increased closed-loop bandwidth for process control systems , DOI: 10.1049/iet-cta.2019.1182
- Yu-Qun Han , Adaptive tracking control for a class of stochastic non-linear systems with input delay: a novel approach based on multi-dimensional Taylor network , DOI: 10.1049/iet-cta.2020.0336
- Qingrong Liu ; Hanfeng Li ; Xianfu Zhang , Event-triggered tracking control for a family of non-linear systems via output feedback , DOI: 10.1049/iet-cta.2020.0356
- Oscar Miguel-Escrig and Julio-Ariel Romero-Pérez , Regular quantisation with hysteresis: a new sampling strategy for event-based PID control systems , DOI: 10.1049/iet-cta.2020.0128
- Ya Gu ; Quanmin Zhu ; Hassan Nouri , Bias compensation-based parameter and state estimation for a class of time-delay non-linear state-space models , DOI: 10.1049/iet-cta.2020.0104
- Manna Li and Weijie Mao , DC-boundary finite-time stabilisation for distributed parameter systems , DOI: 10.1049/iet-cta.2019.0542

**Brief Papers:**

- Le Wang ; Jianxiang Xi ; Zhiyong Yu ; Xia Liu ; Guangbin Liu , Limited-budget finite-time average consensus design for multi-agent systems , DOI: 10.1049/iet-cta.2019.0898
- Ya Zhang ; Yaoyao Wen ; Guoxi Chen ; Yang-Yang Chen , Distributed adaptive observer-based output formation-containment control for heterogeneous multi-agent systems with unknown inputs , DOI: 10.1049/iet-cta.2020.0465
- Heng Liu ; Xin Wang ; Jun-Wei Zhu ; Xian Zhang , Distributed adaptive control for a class of leader–following heterogeneous networks under intermittent communication environment , DOI: 10.1049/iet-cta.2020.0055

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### 4.7. International Journal of Control
Contributed by: Bing Chu, b.chu@soton.ac.uk

International Journal of Control
Volume 93, Issue 10, 2020
http://www.tandfonline.com/toc/tcon20/current

**Papers:**

- Design of robust decentralised controllers for MIMO plants with delays through network structure exploitation, Deesh Dileep , Ruben Van Parys , Goele Pipeleers , Laurentiu Hetel , Jean-Pierre Richard & Wim Michiels, pages: 2275-2289
- Priority altitude PVTOL aircraft control via immersion and invariance, Fernando Hernández-Castañeda , Víctor Santibáñez & Francisco Jurado, pages: 2290-2301

### 4.8. Journal of Pure and Applied Mathematics
Contributed by: Mammadova Gamar, twms.aliev@gmail.com

TWMS Journal of Pure and Applied Mathematics
ISSN 2076-2585
Volume 11, No. 2, 2020

### Papers:

1. Effects of Two-Equation Turbulence Models on the Convective Instability in Finned Channel Heat Exchangers. Survey.
Y. Menni, H. Ameur, G. Lorenzini, M.M. Rashidi, A. Youcef, R. Maouedj

2. New Integral Operator for Solution of Differential Equations
A. Őzyapici, T. Karanfiller

3. The Coefficient Estimates for a Class Defined by Hohlov Operator using Conic Domains
.M. Çağlar, P. Gurusamy, H. Orhan

4. Invertible Square Matrices over Residuated Lattices
S. Balaei, E. Eslami, A. Borumand Saeid

5. Bivariate general random threshold models and exceedance Statistics
A. Erem, I. Bayramoglu

6. On Interpolative Boyd-Wong and Matkowski Type Contractions
H. Aydi, E. Karapinar, Z.D. Mitrović

7. Parabolic Nonsingular Integral Operator and its Commutators on Parabolic Vanishing Generalized Orlicz-Morrey Spaces
M.N. Omarova

8. An Inverse Boundary Value Problem for the Boussinesq- Love Equation with Nonlocal Integral Condition
N.S. Isgendarov, S.I. Allahverdiyeva

9. Analytical Approach to a Class of Bagley-Torvik Equations
F.A. Aliyev, N.A. Aliyev, N.I. Mahmudov, I.T. Huseynov

### 4.9. Automatica
Contributed by: Kay Tancock, k.tancock@elsevier.com

Automatica
Vol 119, September 2020

### Regular Papers:

- Xudong Chen., Ensemble observability of Bloch equations with unknown population density
- Mattia Zorzi., Autoregressive identification of Kronecker graphical models
- Milad Siami, Ali Jadbabaie., A separation theorem for joint sensor and actuator scheduling with guaranteed performance bounds
- Milad Karimshoushtari, Carlo Novara., Design of experiments for nonlinear system identification: A set membership approach

- Mohamed Rasheed-Hilmy Abdalmoaty, Håkan Hjalmarsson., Identification of stochastic nonlinear models using optimal estimating functions
- Pouria Ramazi, Ming Cao., Convergence of linear threshold decision-making dynamics in finite heterogeneous populations
- Vaibhav Kumar Singh, Vivek Natarajan., Reduced-order controllers for multi-agent consensus using output regulation viewpoint
- Yingying Li, Qinran Hu, Na Li., A reliability-aware multi-armed bandit approach to learn and select users in demand response
- Xiangru Xu, Necmiye Ozay, Vijay Gupta., Passivity-based analysis of sampled and quantized control implementations
- Leroy Hazeleger, Mark Haring, Nathan van de Wouw., Extremum-seeking control for optimization of time-varying steady-state responses of nonlinear systems
- Stanley W. Smith, Murat Arcak, Majid Zamani., Approximate abstractions of control systems with an application to aggregation
- Farhad Mehdifar, Charalampos P. Bechlioulis, Farzad Hashemzadeh, Mahdi Baradarannia., Prescribed performance distance-based formation control of Multi-Agent Systems
- Jiahu Qin, Menglin Li, Jie Wang, Ling Shi, Wei Xing Zheng., Optimal Denial-of-Service attack energy management against state estimation over an SINR-based network
- Matthias Pezzutto, Federico Tramarin, Subhrakanti Dey, Luca Schenato., Adaptive transmission rate for LQG control over Wi-Fi: A cross-layer approach
- Haavard Holta, Henrik Anfinsen, Ole Morten Aamo., Adaptive set-point regulation of linear 2x2 hyperbolic systems with application to the kick and loss problem in drilling
- Nuno Miguel Gomes Paulino, Mathias Foo, Jongmin Kim, Declan G. Bates., On the stability of nucleic acid feedback control systems

**Brief Papers:**

- Zhenwei Liu, Ali Saberi, Anton A. Stoorvogel, Donya Nojavanzadeh., Global regulated state synchronization for homogeneous networks of non-introspective agents in presence of input saturation: Scale-free nonlinear and linear protocol designs
- Yao Zou, Ziyang Meng, Yiguang Hong., Adaptive distributed optimization algorithms for Euler–Lagrange systems
- Adam L. Bruce, Ankit Goel, Dennis S. Bernstein., Convergence and consistency of recursive least squares with variable-rate forgetting
- Debbie Hernández, Eli Abraham Vázquez, Leonid M. Fridman, Branislava Peruničić-Draženović., Zero dynamics assignment and its applications to the stabilization of linear time-varying systems
- Francesco Ferrante, Andrea Cristofaro, Christophe Prieur., Boundary observer design for cascaded ODE — Hyperbolic PDE systems: A matrix inequalities approach
- Tengfei Liu, Zhong-Ping Jiang., Distributed control of multi-agent systems with pulse-width-modulated controllers
- Filippo Fabiani, Giuseppe Belgioioso, Franco Blanchini, Patrizio Colaneri, Sergio Grammatico., Convergence in uncertain linear systems
- Stevan Dubljevic, Jukka-Pekka Humaloja., Model predictive control for regular linear systems
- Hanlei Wang., Towards manipulability of interactive Lagrangian systems
- Thomas Berger, Anna-Lena Rauert., Funnel cruise control

- Ting Li, Changyun Wen, Jun Yang, Shihua Li, Lei Guo., Event-triggered tracking control for nonlinear systems subject to time-varying external disturbances
- Frédéric Mazenc, Saeed Ahmed, Michael Malisoff., Reduced order finite time observers and output feedback for time-varying nonlinear systems
- Yijing Xie, Zongli Lin., Suboptimal output consensus for a group of weakly nonminimum phase linear systems
- Satoshi Kawamura, Kai Cai, Masako Kishida., Distributed output regulation of heterogeneous uncertain linear agents
- Yan Zhao, Jianbin Qiu, Shengyuan Xu, Wenguo Li, Junli Wu., Boundary observer-based control for hyperbolic PDE–ODE cascade systems with stochastic jumps
- Shize Su, Zongli Lin., An exploration of the Razumikhin stability theorem with applications in stabilization of delay systems
- Florent Di Meglio, Pierre-Olivier Lamare, Ulf Jakob F. Aarsnes., Robust output feedback stabilization of an ODE–PDE–ODE interconnection
- James Dannatt, Ian R. Petersen, Alexander Lanzon., Strictly negative imaginary state feedback control with a prescribed degree of stability
- Yaning Lin., Necessary/sufficient conditions for Pareto optimality in finite horizon mean-field type stochastic differential game
- Arnold Tshimanga Banza, Ying Tan, Iven Mareels., Integral sliding mode control design for systems with fast sensor dynamics
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### 4.17. CFP: Nonlinear Analysis: Hybrid Systems
Contributed by: Kai Cai, kai.cai@eng.osaka-cu.ac.jp

CFP: Nonlinear Analysis: Hybrid Systems
Special Issue: "Security, Privacy and Safety of Cyber-Physical Systems"

Guest Editors: Kai Cai, Osaka City University (kai.cai@eng.osaka-cu.ac.jp)
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Xiang Yin, Shanghai Jiao Tong University (yinxiang@sjtu.edu.cn)
Majid Zamani, University of Colorado Boulder (Majid.Zamani@colorado.edu)

Cyber-physical systems are engineered systems that are built from and depend upon the synergy of computational and physical components. They are pervasive in today's technological society. Cyber-physical systems usually involve complex interactions of continuous dynamics with discrete logic, referred to as "hybrid" behavior. The development of controller design and verification algorithms for such complex systems are crucial and challenging tasks, due in particular to the theoretical difficulties of analyzing hybrid behavior and to the computational challenges associated with the synthesis of hybrid controllers.

Ever-increasing demands for safety, privacy, security and certification of cyber-physical systems put stringent constraints on their analysis and design, and necessitate the use of formal model-based approaches. In recent years, we have witnessed a substantial increase in the use of formal techniques for the verification and design of privacy-sensitive, safety-critical cyber-physical systems.

The main objective of this special issue to gather recently developed novel approaches devoted to analysis and enforcement of security, privacy and safety of cyber-physical systems using formal techniques. We seek submissions including but not limited to the following topics:
– Security and privacy analysis of cyber-physical systems, including opacity, differential privacy, noninterference and other related notions
– Fault diagnosis, intrusion detection, and attack mitigation of cyber-physical systems
– Supervisory control for safety of discrete-event systems
–Formal methods and reactive synthesis for safety of cyber-physical systems
– Data-driven verification and synthesis of cyber-physical systems
– Distributed approaches for large scale cyber-physical systems and hybrid systems
– Algorithms and tools for verification and synthesis of safety-critical systems
– Applications in security and/or safety of manufacturing systems, transportation systems, energy systems, robotic networks, telecommunications, and computer networks.

Important Submission Dates:
– Open: October 1, 2020
– Due: December 31, 2020

Manuscript should be submitted to https://ees.elsevier.com/nahs

### 4.18. CFP: IEEE/ASME Transactions On Mechatronics
Contributed by: Xiang Chen, xchen@uwindsor.ca

Call for Papers: The Second Edition of Focused Section on TMECH/AIM Emerging Topics

Submissions are called for the Second Edition of Focused Section (FS) on TMECH/AIM Emerging Topics (renamed from previous TMECH/AIM Concurrent Submission). This Focused Section is intended to expedite publication of novel and significant research results, technology and/or conceptual breakthrough of emerging topics within the scopes of TMECH (www.ieee-asme-mechatronics.org). It also provides the rapid access to the state-of-the-art of TMECH publications within the mechatronics community. Note that the First Edition of Focused Section on TMECH/AIM Emerging Topics was already published in August 2020.

The submitted paper must not exceed 8 TMECH published manuscript pages, excluding photos and bios of authors, and will be subject to a normal peer review process in the standard of TMECH. All accepted papers from submissions to the Focused Section will be published in August Issue of TMECH in 2021 and will be presented in the 2021 IEEE/ASME International Conference on AIM. The rejected papers from submissions will be transferred to the Program Committee of AIM 2021 to be further reviewed and considered as contributed conference papers.

The review process for submissions to the Focused Section will be conducted with one round of Major/Minor Revision allowed, and the final decision falls into one of the following two categories:

- Accept for publication in Focused Section. In this case, the paper will be accepted by AIM 2021 concurrently for presentation only with full information of the paper to be included in the preprinted proceeding of AIM 2021. The final publication in TMECH, however, will be subject to the completion of presentation in AIM 2021 with paid full registration fee.
- Reject for publication in Focused Section (in the first and second round). In this case, the paper, as well as all review comments, will be forwarded to the Program Committee of AIM 2021 for further consideration. A final Accept/Reject decision will then be made by the Committee as a contributed conference paper for AIM 2021.

Manuscript preparation: Papers must contain original contributions and be prepared in accordance with the journal standards. Instructions for authors are available online on the TMECH website.

Manuscript submission: Manuscripts should be submitted to TMECH online at: mc.manuscriptcentral.com/tmech-ieee, selecting the track 'TMECH/AIM Emerging Topics'. The cover letter should include the following statement: This paper is submitted to the Second Edition of Focused Section on TMECH/AIM Emerging Topics. The full information of the paper should be submitted concurrently to AIM 2021 online at: ras.papercept.net/conferences/scripts/start.pl., noted with the given TMECH manuscript number.

Submission/Review/Decision Timeline (tentative):

Opening Date of TMECH/AIM FS Submission Site (first submission): November 1, 2020
Closing Date of TMECH/AIM FS Submission Site (first submission): December 5, 2020

Full Information of TMECH/AIM FS Paper Submitted to AIM Site: December 5, 2020
First Decision for TMECH/AIM FS Submission: March 1, 2021
Revised TMECH/AIM FS Submission Due by: March 26, 2021
Final Decision for TMECH/AIM FS Submission: May 1, 2021
Final Version of TMECH/AIM FS Submission Due by: May 15, 2021
Publication of Focused Section in TMECH: August 2021

Contacts: Send enquiries about this Announcement to
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Bram Vanderborght, Bram.Vanderborght@vub.be, Program co-Chair of AIM

### 4.19. CFP: Asian Journal of Control
Contributed by: Li-Chen Fu, lichen@ntu.edu.tw

CFP: Asian Journal of Control
Special Issue on "Analysis and Control of Complex Cyber-Physical Networks"

A large number of coupled systems in nature and society can be modeled by complex cyber-physical networks, whose normal functioning significantly relies on the tight interactions between its physical and cyber components. Many modern critical infrastructures can be appropriately modelled as complex cyber-physical networks. Typical examples of such infrastructures are power grids, the Internet, WWW, and public transportation systems. The ubiquity of such networked systems leads to many important and fascinating scientific problems concerning how network topologies and parameters affect collective dynamics, and how to control them. Analysis and control of complex cyber-physical networks have received a lot of attention recently, from various scientific and engineering communities. Furthermore, revealing the fundamental properties and controlling the collective behaviors of networked systems not only can provide a better understanding of the emergence mechanisms for cooperative behaviors, but also can provide benefits to various applications of cyber-physical networked systems, such as smart grids, Internet of Things and unmanned aircraft systems.

The focus of this special issue is on new approaches to analysis and synthesis of complex cyber-physical networks as well as their potential practical applications. The special issue aims to establish a forum for international researchers from different fields of electrical engineering, bioinformatics, systems and control theory, and applied mathematics, to present and evaluate the most recent developments and new ideas on analysis and synthesis of complex cyber-physical networks, regarding both fundamental theory and practical applications.

The topics to be covered include, but are not limited to:

* Analysis and coordination control of complex cyber-physical networks
* Bio-inspired control techniques for networked systems
* Big-data mining and analysis over complex cyber-physical networks
* Controllability and observability of complex cyber-physical networks
* Distributed cognitive architectures in robotic networks

* Distributed control and estimation of multi-agent networks
* Distributed optimization of multi-agent networks
* Deep learning and intelligent control of complex cyber-physical networks
* Distributed machine learning in complex cyber-physical networks
* Distributed reinforcement learning techniques for networked systems
* Energy management and distributed intelligent control of smart grids
* Efficient privacy protection and security of complex cyber-physical networks
* Finite-time and fixed-time control of complex cyber-physical networks
* Game analysis and control over complex cyber-physical networks

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Important Dates:
November 30, 2020 Deadline for Submissions
February 28, 2021 Completion of First Review
May 31, 2021 Completion of Final Review
August 31, 2021 Receipt of Final Manuscript
January 31, 2021 (Tentatively Vol. 24, No. 1) Publication

### 4.20. CFP: SIAM Journal on Control and Optimization
Contributed by: Francesco Bullo, bullo@ucsb.edu

Extended deadline: Call for Papers: SIAM Journal on Control and Optimization Special Section on Mathematical Modeling, Analysis, and Control of Epidemics

As announced previously, the SIAM Journal on Control and Optimization (SICON) plans a Special Section to bring together contributions at the intersection of the fields of systems and control theory and the mathematical study of epidemic spread processes. We envision submissions related to COVID-19, but we additionally encourage general topics associated with epidemic processes.

Submissions will be now accepted until November 1, 2020.

The ongoing COVID-19 pandemic has brought to the spotlight the critical importance and danger of complex epidemic processes. The intent of the section is to gather recent developments aimed at addressing the fundamental challenges inherent in the mathematical analysis, estimation, and control of epidemics. Specific topics addressed in the section include (but are not limited to):

- Mathematical modeling and analysis methods, including ordinary and partial differential equations as well as deterministic and stochastic systems
- Closed-loop control design strategies, including triggers for enforcing and relaxing non-pharmaceutical intervention strategies
- Optimization algorithms for intervention scheduling and resource allocation,
- Computational methods for stochastic simulation
- Learning methods for early tracking, identification, inference, and data-driven analysis.

All interested should submit a manuscript and cover letter in PDF format via SICON's online submission site: https://sicon.siam.org. Note the block labeled Special Section (just under the keywords block on your submission screen). From the dropdown select " Mathematical Modeling, Analysis, and Control of Epidemics."-
If any questions, contact Mitch Chernoff, SIAM Publications Manager, at chernoff@siam.org, or Brian Fauth, Editorial Associate, at sicon@siam.org. Questions about suitability of content can be directed to Francesco Bullo, guest editor-in-charge, at bullo@engineering.ucsb.edu.-
Guest Editors:
- Carolyn Beck, University of Illinois, Urbana-Champaign
- Francesco Bullo, University of California, Santa Barbara
- Giacomo Como, Politecnico di Torino
- Kimon Drakopoulos, University of Southern California
- Dang H. Nguyen, University of Alabama
- Cameron Nowzari, George Mason University
- Victor M. Preciado, University of Pennsylvania
- Shreyas Sundaram, Purdue University

### 4.21. CFP: IEEE Vehicular Technology Magazine Special Issue
Contributed by: Ricardo de Castro, Ricardo.deCastro@dlr.de

CFP: Recent Advances in Motion Control, Estimation and Diagnosis for Automated Vehicles: IEEE Vehicular Technology Magazine

The vehicle of the future is expected to be automated. High levels of vehicle automation are seen as enabling technologies to improve road safety–more than 90% of today's car crashes are still due to human errors–road utilization and reduce air pollutant emissions. However, to make this happen, research communities still need to address several challenges. Vehicle automation requires information about the surrounding environment, road conditions and vehicle states, which is difficult to accurately sense. This uncertain information creates challenges for safe and reliable decision making and control of the vehicle, as well as for testing and validation. Additionally, with the increase in vehicle automation the rate of utilization is expected to grow significantly – think of self-driving taxis or trucks operating 24/7. This will raise the vehicle's reliability demands, requiring timely diagnosis of faults, as well as effective mitigation strategies for fault-tolerant operation. This Special Issue encourages researchers working in this field to share their latest developments on control, estimation and diagnosis functions relevant for vehicle automation.

The topics of interest include, but are not limited to:

• Motion control algorithms, including advanced control and decision-making strategies for longitudinal, lateral and vertical vehicle dynamics
• Frameworks for road state estimation, such as road height irregularities, slope, bank angle or grip levels between tyre and road, which are instrumental to autonomously operative vehicles at the limit of adhesion, as well as vehicle and tires state estimation, including position, velocity and orientation
• Diagnosis and fault estimation of safety-critical vehicular sub-systems, actuators and sensors, as well as digital twins to support and improve lifetime diagnosis functions
• Distributed electrical propulsion architectures, e.g. with in-wheel motors and by-wire actuation, as a mean to enhance vehicle controllability and fault-tolerance operation
• Exploitation of connectivity with other vehicles and infrastructure in the design of vehicular control and estimation functions
• Modelling and simulation methods to accelerate and improve the development of vehicle automation functions, including virtual and experimental testing techniques and implementations in embedded systems
• Standardization opportunities in vehicle automation, including analysis of existing standards and discussion of future standardization needs, such as safety metrics of automated vehicles
• Application use cases in road and off-road vehicles, e-bikes, motorcycles, buses, trucks, etc

All manuscripts should contain state-of-the-art material presented in a tutorial or survey style, and must adhere to IEEE VTM guidelines. Manuscript should be submitted to http://www.ieeevtc.org/vtmagazine/specisu–AutomatedVehicles.php

Important Submission Dates:

– Open: September 15, 2020

– Due: November 15, 2020

Guest Editors

- Dr. Ricardo de Castro, German Aerospace Center (DLR), Germany
- Prof. Basilio Lenzo, Sheffield Hallam University, United Kingdom
- Prof. Yan Chen, Arizona State University, USA
- Dr. Shaobing Xu, University of Michigan, Ann Arbor, USA
- Prof. Shengbo Eben Li, Tsinghua University, China

### 4.22. CFP: IEEE/ASME Transactions on Mechatronics
Contributed by: C.C. Cheah, ecccheah@ntu.edu.sg

IEEE/ASME Transactions on Mechatronics
Focused Section on Mechatronics and Automation for Constructions

Rapid advances in modern technologies have completely revolutionized many industries in recent years. It is anticipated that mechatronic and automation technologies would play an important role in transforming the construction industry to embrace for the fourth industrial revolution. However, construction automation problems bring up new research challenges that diverge from traditional methods. Unlike the factory environment, which is typically structured and predictable, construction sites are dynamic places where the working environment is unstructured and always changing. Due to lack of skilled labour, time and cost overruns, quality deficiencies and the recent pandemics, mechatronic and automated technologies offer solutions for future safe, rapid, performative, prize worthy and digitally protocolled construction projects.

The coexistence of human workers, heavy vehicles, varying environmental conditions and automated mechatronic systems also make safe human-machine interaction an important issue. Beyond expertise in a specific discipline, construction automation also requires multidisciplinary expertise to integrate with various fields, such as Internet of Things (IOT), robotics and its construction oriented subsystems, adaptive/robust control, machine vision, sensing technologies, artificial intelligence, and Building, Construction, Process Information Modelling (BIM/CIM/PIM) for automated construction process management and design. The main aims of this focused section in IEEE/ASME Transactions on Mechatronics (TMECH) are to document the current state of art in mechatronics and automation for constructions, and to present new results in several emerging research areas. Submissions can address theoretical aspects in these areas but approaches or technologies that consider aspects such as market needs, innovation management, and the requirements for industry-level diffusion or deployment are encouraged. The topics of interest within the scope of this focused section include but not limited to:
• Mechatronic systems for construction automation
• Artificial Intelligence for automated/mechatronic construction engineering
• Real time Localization and Navigation in automated/mechatronic construction environment
• Human-machine interaction and control
• Information based (BIM, CIM, PIM) techniques for construction automation/mechatronics
• Automated/mechatronic methods and systems in unstructured environment

• Mechatronics in additive construction

Manuscript preparation: Papers must contain original contributions and be prepared in accordance with the journal standards. Instructions for authors are available online at: http://www.ieee-asme-mechatronics.org/

Manuscript submission: Manuscripts should be submitted online at: https://mc.manuscriptcentral.com/tmech-ieee. Please indicate in the cover letter that your paper is for possible publication in the Focused Section on Mechatronics and Automation for Constructions. All manuscripts will be subjected to the regular TMECH peer review process. Any questions relating to this focused section can be sent to any of the Guest Editors via emails.

Important dates:
Paper Submission January 1, 2021
Completion of First Review April 1, 2021
Submission of Revised Papers May 15, 2021
Completion of Final Review July 15, 2021
Submission of Final Manuscripts and Copyright Forms August 31, 2021
Publication October, 2021

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### 4.23. CFP: Asian Journal of Control
Contributed by: Li-Chen Fu, lichen@ntu.edu.tw

Asian Journal of Control
Special Issue on "Emerging Control Techniques for Mechatronic and Transportation Systems"

It is extremely important in the contemporary global society to develop reliable control techniques for mechatronic and transportation systems that can be easily implemented using modern digital and wireless technologies to force engineering systems to behave like skilled workers who work quickly, accurately, and cheaply, despite parametric variations, nonlinearities, and persistent disturbances. Many engineering control problems still remain unsolved, especially for mechatronic and transportation systems, under the following realistic hypotheses: parametric and/or structural uncertainties, fast-varying references, measurement noises, real amplifiers and actuators, and/or finite online computation time of the control signal. Furthermore, to reduce the gap between theory and practical feasibility, the designed control laws should be easy to design and implement with smart sensors, power supplies, and intelligent actuators.

The objective of this Special Issue is to present emerging control techniques for mechatronic and transportation systems that can be successfully applied to numerous engineering applications (e.g., control of rolling mills, conveyor belts, unicycles, bicycles, cars, trains, ships, airplanes, drones, missiles, satellites, platoons, manufacturing robots, such as welding, painting, assembly, pick and place for printed circuit boards, packaging and labeling, palletizing, product inspection, and testing ones, and surgical robots). The topics include but are not limited to:

– Unmanned systems
– Industrial robots
– Remote servomechanisms
– Transportation systems
– Vehicle platoons
– Networked autonomous agents
– Smart sensors and actuators
– Human-machine interaction and human-machine cooperation
– IoT control design
– From research to industry

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Important Dates:
September 15, 2020 Deadline for Submissions
November 15, 2020 Completion of First Review
January 15, 2021 Completion of Final Review
January 31, 2021 Receipt of Final Manuscript
March 31, 2021 (Tentatively Vol. 23, No. 2) Publication

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Special Issue on "Analysis and Control of Complex Cyber-Physical Networks"

A large number of coupled systems in nature and society can be modeled by complex cyber-physical networks, whose normal functioning significantly relies on the tight interactions between its physical and

cyber components. Many modern critical infrastructures can be appropriately modelled as complex cyber-physical networks. Typical examples of such infrastructures are power grids, the Internet, WWW, and public transportation systems. The ubiquity of such networked systems leads to many important and fascinating scientific problems concerning how network topologies and parameters affect collective dynamics, and how to control them. Analysis and control of complex cyber-physical networks have received a lot of attention recently, from various scientific and engineering communities. Furthermore, revealing the fundamental properties and controlling the collective behaviors of networked systems not only can provide a better understanding of the emergence mechanisms for cooperative behaviors, but also can provide benefits to various applications of cyber-physical networked systems, such as smart grids, Internet of Things and unmanned aircraft systems.

The focus of this special issue is on new approaches to analysis and synthesis of complex cyber-physical networks as well as their potential practical applications. The special issue aims to establish a forum for international researchers from different fields of electrical engineering, bioinformatics, systems and control theory, and applied mathematics, to present and evaluate the most recent developments and new ideas on analysis and synthesis of complex cyber-physical networks, regarding both fundamental theory and practical applications.

The topics to be covered include, but are not limited to:
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– Bio-inspired control techniques for networked systems
– Big-data mining and analysis over complex cyber-physical networks
– Controllability and observability of complex cyber-physical networks
– Distributed cognitive architectures in robotic networks
– Distributed control and estimation of multi-agent networks
– Distributed optimization of multi-agent networks
– Deep learning and intelligent control of complex cyber-physical networks
– Distributed machine learning in complex cyber-physical networks
– Distributed reinforcement learning techniques for networked systems
– Energy management and distributed intelligent control of smart grids
– Efficient privacy protection and security of complex cyber-physical networks
– Efficient privacy protection and security of complex cyber-physical networks
– Finite-time and fixed-time control of complex cyber-physical networks
– Game analysis and control over complex cyber-physical networks

Guest Editors:

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Important Dates:
November 30, 2020 Deadline for Submissions
February 28, 2021 Completion of First Review
May 31, 2021 Completion of Final Review
August 31, 2021 Receipt of Final Manuscript
January 31, 2021 (Tentatively Vol. 24, No. 1) Publication

# 5   Conferences and Workshops

### 5.1.  Conference on Learning for Dynamics and Control 2021, Switzerland
Contributed by: Melanie Zeilinger, mzeilinger@ethz.ch

Call for Papers: 3rd Annual Conference on Learning for Dynamics and Control, L4DC 2021
ETH Zurich, Switzerland, June 7-8, 2021
Submission Deadline: November 13, 2020
http://l4dc.org

On behalf of the Organizing Committee, it is our pleasure to invite you to contribute to and participate in the 2021 Conference on Learning for Dynamics and Control, which will take place in Zurich, Switzerland, June 7-8, 2021.

L4DC is an interdisciplinary venue for researchers at the intersection of machine learning, control, system theory, optimization and related areas. It has been launched in 2019 to create a new community of people that thinks rigorously across the disciplines, asks new questions, and develops the foundations of this new scientific area.

In addition to a series of invited talks, we again invite submissions of short papers. The deadline for paper submission is November 13, 2020.
Please find more information below or on the website: l4dc.org .
We look forward to meeting you at L4DC 2021 in Zurich!

Ben Recht, Claire Tomlin, Ali Jadbabaie, George Pappas, Pablo Parrilo, John Lygeros, Melanie Zeilinger (Organizers L4DC 2021)

Publication and presentation: All accepted papers will be presented as posters at this conference. A selected set of papers deemed particularly exceptional by the program committee will be presented as oral talks. At least one of each paper's authors should present the work. Accepted papers will be published electronically in the Proceedings of Machine Learning Research (PMLR).

Dual Submission Policy: Submissions that are substantially similar to papers that have been previously published, accepted for publication, or submitted in parallel to other peer-reviewed conferences with proceedings or journals may not be submitted to L4DC.

Topics: We invite submissions of short papers addressing topics including:
• Foundations of learning of dynamics models
• System identification
• Optimization for machine learning
• Data-driven optimization for dynamical systems
• Distributed learning over distributed systems
• Reinforcement learning for physical systems
• Safe reinforcement learning and safe adaptive control
• Statistical learning for dynamical and control systems

• Bridging model-based and learning-based dynamical and control systems
• Physics-constrained learning
• Physical learning in dynamical and control systems applications in robotics, autonomy, transportation systems, cognitive systems, cognitive systems, neuroscience, etc.

While the conference is open to any topic on the interface between machine learning, control, optimization and related areas, its primary goal is to address scientific and application challenges in real-time physical processes modeled by dynamical or control systems.

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### 5.2. CDC 2020 Virtual Program, South Korea
Contributed by: Hideaki Ishii, ishii@c.titech.ac.jp

IEEE Conference on Decision and Control, Republic of Korea
59th IEEE Conference on Decision and Control, December 14-18, 2020 Jeju Island, Republic of Korea
http://cdc2020.ieeecss.org
Join us at the first virtual CDC!

The online program can be found at
https://css.paperplaza.net/conferences/conferences/CDC20/program/.

The virtual program will be held over 5 days, with 4.5 hours per day, scheduled to start at 13:00 (1:00 pm) Coordinated Universal Time (UTC), which is one week later than was originally planned. The virtual sessions schedule will comprise 17 parallel tracks including Tutorial Sessions and COVID-19 Focus Sessions. The regular and invited sessions comprise 15-minute slots for the presentation video and the Q&A live session.

Bode Lecture, Plenary and Semi-Plenary Lectures: The Bode Lecture will be presented by Kristin Y. Pettersen, Norwegian University of Science and Technology, Norway. The plenary lecture will be delivered by Stephen P. Boyd, Stanford University, USA. The semi-plenary speakers will be Murat Arcak, University of California, Berkeley, USA; Franco Blanchini, University of Udine, Italy; Shinji Hara, Tokyo Institute of Technology, Japan; and Jonathan P. How, Massachusetts Institute of Technology, USA.

Workshops: A number of pre-conference workshops will be offered on Saturday and Sunday, December 12-13, 2020 during the same hours as the conference:

Two-day Workshops, 1-5 pm UTC, December 12 & 13 (Sat & Sun)

T1. Advanced Battery Management: Recent Advances and Future Innovations
T2. Real time NMPC: From Fundamentals to Industrial Applications
T3. Data-driven Control
T4. Dynamics in Social and Economic Networks
T5. Non-linear and adaptive control: A tribute to Laurent Praly for his 65th birthday

One-day Workshops, 1-5 pm UTC, December 13 (Sun)

O1. Control, Optimization, and Learning Methods for Emerging Mobility Systems
O2. Compressed Sensing and Sparse Representation for Systems and Control
O3. Learning and Security for Multi-Agent Systems

Registration: Currently, conference registration can still be made at much reduced rates than originally planned due to going virtual. The first category includes paper uploads. The second category, newly introduced for the virtual CDC, does not include paper uploads and is available at rates even further reduced. Both categories include access to the virtual venue, electronic proceedings, live sessions, and on-demand presentations. For details, please visit the conference website.

General Chairs
Richard D. Braatz, Massachusetts Institute of Technology, USA
Chung Choo Chung, Hanyang University, Republic of Korea

Advisor
Dong-il Dan Cho, Seoul National University, Republic of Korea

Program Chairs
Jay H. Lee, KAIST, Republic of Korea
Luca Zaccarian, LAAS-CNRS, France, University of Trento, Italy

### 5.3. World Congress: Math Problems in Engineering & Aerospace, Czech Republic
Contributed by: Seenith Sivasundaram, seenithi@gmail.com

World Congress: Mathematical Problems in Engineering, Aerospace, and Sciences
When: Date: June 22-25, 2021
Where: Location: Czech Technical University in Prague, Prague, Czech Republic
Website: http://www.icnpaa.com
http://www.icnpaa.com/index.php/icnpaa/ICNPAA2020

ICNPAA's AIM: Mathematical Problems in Engineering, Aerospace, and Science have stimulated cooperation among scientists from a variety of disciplines. Developments in computer technology have additionally allowed for solutions to mathematical problems. This international forum will extend scholarly cooperation and collaboration, encouraging the dissemination of ideas and information. The conference will have a pool of active researchers, with a proper balance between academia and industry, as well as between senior and junior researchers, including graduate students and post-doctoral fellows. It is anticipated that such a balance will provide both senior and junior researchers an opportunity to interact and to have a wider picture of recent advances in their respective fields. The conference, especially, enables the setting up of new interdisciplinary research directions among its participants by establishing links with world-renowned researchers, making possible joint international projects that will no doubt bring about fresh and innovative ideas and technologies in engineering, aerospace, and sciences.

Co-Sponsored by:
AIAA: American Institute of Aeronautics and Astronautics
IFIP: International Federation of Information Processing
CTU: Czech Technical University in Prague, Prague, Czech Republic

The proceedings will be published by the American Institute of Physics. AIP Conference Proceedings are indexed in:
• Astrophysics Data System(ADS)
• Chemical Abstracts Service (CAS)
• Crossref
• EBSCO Publishing
• Electronic Library Information Navigator (ELIN), Sweden
• Elsevier – SCOPUS
• International Atomic Energy Agency (IAEA)
• Thomson Reuters (ISI)

### 5.4. ACM International Conference on Hybrid Systems, USA
Contributed by: Guillaume Berger, guillaume.berger@uclouvain.be

24th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2021)
Part of CPS-IoT Week 2021
May 19-21, 2021
Nashville, Tennessee, USA
URL: https://hscc.acm.org/2021/

Hybrid Systems: Computation and Control (HSCC) 2021 is the 24th in a series of conferences focusing on original research on concepts, tools, and techniques from computer science, control theory, and applied mathematics for the analysis and control of hybrid dynamical systems, with an emphasis on computational aspects. By drawing on strategies from computation and control, the hybrid systems field offers techniques that are applicable to both man-made cyber-physical systems (ranging from small robots to global infrastructure networks) and natural systems (ranging from biochemical networks to physiological models). Papers in the conference are expected to range over a wide spectrum of topics from theoretical results to practical considerations, and from academic research to industrial adoption.

Topics of interest include, but are not limited to:

- Mathematical foundations, computability and complexity
- Analysis, verification, validation, and testing
- Modeling paradigms and techniques
- Design, synthesis, planning, and control
- Programming and specification languages
- Network science and network-based control
- Security, privacy, and resilience for cyber-physical systems with focus on computation and control
- Safe autonomy, Artificial intelligence and Machine learning in CPS

- Software tools for the above topics
- Applications and industrial case studies in: automotive, transportation, autonomous systems, avionics, energy and power, robotics, medical devices, manufacturing, systems and synthetic biology, models for the life sciences, and other related areas.

Two special areas: Similarly to last year, HSCC invites submissions exploring synergies with artificial intelligence as part of a special session "Safe and trustworthy AI". In addition, the conference will feature a special session on "Systems biology and epidemiology" which aims at addressing the challenges that emerged with COVID-19.

Submission Guidelines: *New this year*: HSCC invites submissions in two categories: (1) regular papers and (2) tool and case study papers. Submissions in *both* of these categories can be either long (10 pages max, 9pt font, two-column ACM format) or short papers (6 pages max, 9pt font, two-column ACM format). We will employ a double blind reviewing process and will have a rebuttal phase to provide authors the opportunity to reply to reviewer concerns. Authors are asked to submit their paper using EasyChair: https://easychair.org/conferences/?conf=hscc2021.

Important dates: Submission deadline: *October 26, 2020 (AOE)*
Tool/case study paper repeatability package submission deadline: November 1, 2020 (AOE)
Rebuttal phase: Beginning of December 2020 (tentative)
Acceptance/rejection notifications: December 2020 (tentative)
Posters/demos submission deadline: January 2021 (tentative)

PC Chairs:
Sergiy Bogomolov (Newcastle University, UK)
Raphaël Jungers (UCLouvain, Belgium)

Repeatability Evaluation Chairs:
Stanley Bak (Stony Brook University, USA)
Bardh Hoxha (Toyota Research Institute of North America, USA)

Publication Chair:
Nikos Athanasopoulos (Queen's University Belfast, UK)

Publicity Chair:
Dorsa Sadigh (Stanford University, USA)

Demo/Poster Chair:
Jana Tumova (KTH, Sweden)

Awards Chair:
Antoine Girard (L2S-CNRS, Paris)

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Thao Dang (Verimag, France)
Martin Fränzle (Universität Oldenburg, Germany)
Radu Grosu (TU Wien, Austria)
Sayan Mitra (UIUC, USA)
Paulo Tabuada (UCLA, USA)
Claire Tomlin (University of California, Berkeley, USA)

### 5.5. IEEE SmartGridComm 2020, Virtual
Contributed by: Anuradha Annaswamy, aanna@mit.edu

The 11th IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm 2020)
11-13 November 2020
Venue: VIRTUAL
Conference link: https://sgc2020.ieee-smartgridcomm.org/
Registration link: https://sgc2020.ieee-smartgridcomm.org/registration

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### 5.6. IROS Workshop: Mechanisms and Design from Inception to Realization
Contributed by: Hao Su, haosu.robotix@gmail.com

IROS workshop call for abstracts and speakers: Mechanisms and Design from Inception to Realization

Please see the call for abstracts and speakers of our IROS workshop.

Title: Mechanisms and Design from Inception to Realization
Time: 8:00AM-Noon, Oct 29, 2020, New York Time (EST)
Location: visit the following website for Zoom meeting registration
Website: https://haosu-robotics.github.io/2020iros-mechanismdesign-workshop.html

*****Important Dates****
Submission deadline: Oct 4, 2020
Notification of acceptance: Oct 9, 2020
Workshop: Oct 29, 2020, New York Time (EST)

****Workshop Description****
Mechanisms and design are critical to many advances in various fields of robotics. Still, many aspects of the design process are often left out of the reports on the work (like publications and presentations), which focus almost exclusively on the final iteration and its performance. Instead of focusing exclusively on a particular research advancement (i.e., facts or final results), presentations and contributions will center on the process of design (i.e., wisdom) as fundamental to many areas, and illustrate it through multiple novel mechanisms and robots at the leading edge of state of the art.

This workshop aims to provide its audience an instructive view into the complete design process of some of the most successful of today's robots, from inception to realization. Invited speakers and contributors will present their work, starting from the original idea that sparked the process, through multiple design iterations (including failed prototypes and lessons learned), and finally arriving at the "demo unit". The workshop will illustrate this process in multiple domains. Submission format: Abstract in PDF format, using IEEE template (no more than 2 pages) Submission: By email using the following address: iros2020_mechanismdesign@columbia.edu

Please use "[Mechanisms and Design] - last name of first author" for the title of your email. We will select 5 speakers from the abstract contributions to deliver 5min talks (including 1min Q&A). Contributions should be submitted in the form of 1 or 2 page abstract in the email submission. Contributors are encouraged to submit a short video (e.g., a YouTube link) illustrating their work along with their abstracts. The abstract of selected contributions will be posted on the workshop website.

****Topics of Interest****
* Mechanism and design
* Design process
* Failure resilient, robot safety
* Human-robot collaboration
* Exoskeletons and wearable robots

* Soft robots, surgical robots
* Mechanical resilience of robotic systems

****Invited speakers****
*Mark Cutkosky, Stanford
*Bram Vanderborght, Vrije Universiteit Brussel
*Koichi Suzumori, Tokyo Institute of Technology
*Jean-Pierre Merlet, INRIA
*Sangbae Kim, MIT
*Carmel Majidi, CMU
*Ronald Fearing, UC Berkeley
*Hao Su, City University of New York
*Elliott Rouse, University of Michigan
*Kaspar Althoefer, Queen Mary University of London

****Organizers****
* Hao Su, City University of New York, USA
* Matei Ciocarlie, Columbia University, USA
* Kyujin Cho, Seoul National University, South Korea
* Darwin Lau, Chinese University of Hong Kong, China
* Claudio Semini, Istituto Italiano di Tecnologia, Italy
* Damiano Zanotto, Stevens Institute of Technology, USA

Hao Su, Ph.D.
Irwin Zahn Endowed Assistant Professor
Director, Lab of Biomechatronics and Intelligent Robotics (BIRO)
Lab Web: https://haosu-robotics.github.io
Director, Center of Assistive and Personal Robotics for Independent Living (APRIL)
APRIL Center Web: https://assistiverobotcenter.github.io
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Phone: 212.650.5228
Office: Steinman Hall, Room 225
275 Convent Avenue New York, NY 10031
Lab: Marshak Science Building, Room 705
160 Convent Avenue New York, NY 10031

### 5.7. IEEE International Conference on Industrial Cyber-Physical Systems, Canada
   Contributed by: Ahmad W. Al-Dabbagh, ahmad.aldabbagh@ubc.ca

The 4th IEEE International Conference on Industrial Cyber-Physical Systems (ICPS), May 10 - 13, 2021, Victoria, British Columbia, Canada

http://ieee-icps2021.org
Full Paper Submission: November 10, 2020
Special Session Proposals: December 1, 2020
Notification of Acceptance: January 10, 2021
Final Submission of Full Manuscript: February 10, 2021
Early Bird Registration: February 10, 2021

ICPS 2021 is a majority sponsored conference by the IEEE Industrial Electronics Society. ICPS 2021 is to provide a forum to exchange research and innovation results, lessons learned from industrial practices, such as Cyber-Physical Systems, Digital Economy, the Industrial-Internet-of-Things and so on. The ICPS annually gathers together Industry experts, researchers and academics to share ideas, paradigms and experiences surrounding frontier technologies, breakthroughs, innovative solutions, research results, as well as initiatives related to cyber-physical systems and their applications.

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### 5.8. CDC 2020 Workshop: Advanced Battery Management
   Contributed by: Huazhen Fang, fang@ku.edu

Two-Day Online Workshop on Advanced Battery Management: Recent Advances and Future Innovations
December 12-13, 2020, Sat-Sun, 1-5PM (UTC; Coordinated Universal Time)
Webpage: https://cdc-abm.ku.edu

It is our pleasure to invite you to participate in the workshop on advanced battery management at the upcoming 59th IEEE CDC.

Battery energy storage systems play a key role in moving the world into a clean energy era. Their optimal control and management has attracted considerable research from the systems and control community in the past decade. The growing efforts have led to tremendous progresses while continuously stimulating exciting insights into emerging challenges. This workshop will gather veteran researchers across academia and industry to share up-to-date advances and perspectives about future innovations. It also aims to foster a creative space for open discussions among participants.

The talks will cover various key dimensions of this field, highlighting a confluence of electrochemical modeling, control theory, machine learning and industrial applications. We welcome researchers, graduate students and professional engineers to join the workshop and gain an exciting exposure to the cutting-edge developments, new trends and open challenges in this field.

Organizers: Huazhen Fang, Xinfan Lin, Scott Moura, and Simona Onori

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# 6 Positions

### 6.1. PhD: Munich University of Applied Sciences, Germany
Contributed by: Axel Busboom, axel.busboom@hm.edu

With 18,000 students, 466 professors and 782 staff members and researchers, Munich University of Applied Sciences (MUAS) is the second largest university of applied sciences in Germany. It offers Bachelor's and Master's programs in engineering, economics, management, natural and social sciences, public health, architecture and design. Its education is practically oriented and strongly tied to industrial applications. In collaboration with universities, MUAS also offers PhD programs in several disciplines. Applied research at MUAS is based on close cooperation with industry partners and has a strong focus on technology transfer.

The challenge: We offer a full-time, fixed-term Ph.D. position in the area of machine learning. The successful applicant will work on the Equipment Health Centre (EHC) project in close collaboration with Linde, a leading industrial gases and engineering company, and with Politecnico di Milano, the largest university in Italy and one of the most renown engineering schools in Europe.

The EHC project aims at developing AI-based methods for predictive maintenance in the process industry at a plant level. In this industry, systems for predictive maintenance and condition monitoring are currently employed at an asset level and are mostly based on physics-based approaches. The project aims at combining these asset-level systems with machine learning approaches at a plant level in order to determine root causes of and generate recommendations for the plant operator with regards to maintenance and operations decisions. The EHC system will continuously learn from new data and provide recommendations for additional sensors or monitoring systems.

Your profile:
• Master's degree in Computer Science, Chemical Engineering, Physics, Electrical Engineering or a related discipline.
• Strong background in machine learning, signal processing, and modeling.
• Very good skills in MATLAB and/or other state-of-the-art tools for modeling and machine learning (e.g. TensorFlow, Python scikit-learn, Mathematica).
• Very good skills in at least one programming language (e.g. Python, Java).
• Knowledge in process technology is an advantage.
• Excellent command of English is mandatory. Knowledge of German and/or Italian would be an advantage, but are not required.
• Self-driven, curious and open minded, perseverant.
• Very good communication and presentation skills.
• Applicants MUST have legal authorization to work in the European Union.

We offer you:

• The opportunity to pursue a Ph.D. degree in collaboration with Politecnico di Milano.
• The opportunity to closely collaborate with Linde, a leading industrial gases and engineering company and one of the 30 companies listed in the DAX stock index.

• The opportunity to work on an exciting research project in the area of machine learning with both a strong application focus and cutting-edge scientific challenges.

• The opportunity to work in Munich – a vibrant city ranked number three worldwide in Mercer's 2019 Quality of Living survey.

• A full-time, fixed-term position for three years, starting Jan 1, 2020.

• A salary according to the German public service scheme , grade TV-L E13 (approximately 50,000 EUR gross p.a., plus pension contributions and other benefits).

In accordance with the equal opportunity policy of MUAS, female candidates are particularly encouraged to apply. Severely disabled applicants of equal merit and qualifications will be given priority. Opening of the position is pending final approval by the funding agency.

Interested candidates should contact Prof. Axel Busboom at axel.busboom@hm.edu and send their CV, academic transcripts and a brief statement detailing their expertise and their motivation for this particular research position.

### 6.2. PhD: ETH Zurich, Switzerland
Contributed by: Alisa Rupenyan, ralisa@control.ee.ethz.ch

PhD position ETH Zurich Automatic Control Laboratory

We invite applications for PhD positions that are part of a long-term collaborative research effort between ETH Zurich, EPFL Lausanne, and FHNW within the new National Centre of Competence in Research "Dependable Ubiquitous Automation" (NCCR Automation), funded by the Swiss National Science Foundation.

The project will address the problem of developing new control systems unifying ideas from iterative learning control, model predictive control, and learning of the system dynamics or performance, with applications to additive or robot-based manufacturing.

Key challenges to be addressed are:

• Integrating model dynamics learned from simulation and system data
• Efficient computational techniques for real-time implementation
• Ensuring robustness of the algorithm on an available system

The project is focused on general method development, guided by the additive manufacturing application. The ideal candidate will have an interest both in control methods in general and in experimental implementations.

Requirements: The ideal candidate will have:

• A Master's degree from a recognized university (or will be close to completion);
• Excellent GPAs and analytical skills;

• A strong background in systems and control; prior knowledge in optimization is a plus (outstanding candidates with different background are encouraged to apply);
• Proficient oral and written English skills.

To apply Candidates should include the following documents in their application: CV; Short statement of objectives and research interests (1-2 pages); Transcripts of all obtained degrees in English; Names and contact information of three references; One publication (MSc thesis or paper). Please email your application to Prof. John Lygeros lygeros@control.ee.ethz.ch and Dr. Alisa Rupenyan ralisa@control.ee.ethz.ch. Further information about the Automatic Control Laboratory can be found on our website www.control.ee.ethz.ch. Questions regarding the position should be directed to Alisa Rupenyan.

### 6.3. PhD: Lakehead University, Canada
   Contributed by: Abdelhamid Tayebi, atayebi@lakeheadu.ca

A Ph.D. position is available in the Electrical and Computer Engineering graduate program at Lakehead University, Canada. The research topic will be in the area of control systems and aerial robotics. Students with a strong background in control systems and robotics are encouraged to apply. Please send your CV to Prof. Abdelhamid Tayebi (atayebi@lakeheadu.ca).

### 6.4. PhD: TU Delft, The Netherlands
   Contributed by: Riccardo Ferrari, r.ferrari@tudelft.nl

Two PhD positions at Delft Center for Systems and Control, TU Delft (The Netherlands)

The Delft Center for Systems and Control (DCSC) at Delft University of Technology (TU Delft) in the Netherlands has vacancy for Two PhD Positions in Sparse Data Driven Methods for Prognosis of Electric Vehicles

Background: the introduction of next generation heavy electric vehicles, such as electric trucks, is seen as an important contribution to worldwide efforts to curb greenhouse gases emission levels. Still, to deliver their promised performances, such novel electric vehicles should be robust to faults and be designed to optimize their maintenance.

While advanced diagnosis and prognosis algorithms that are suitable for fleets of complex vehicles are model-based, their design, tuning and validation require considerable amounts of data. Large and densely populated data sets, unfortunately, may not always be available, especially during the design phase of such vehicles. The challenge of tuning and validating diagnosis and prognosis algorithms using datasets that are sparse over time and over the vehicles' population is precisely the motivation for the two PhD openings.

Project Description: the successful candidates will carry out research as part of the project "SPARSITY: using data from sparse measurements for predictive maintenance", which is an academic-industrial collaboration between Dr. Riccardo Ferrari's group at Delft Center for Systems and Control (TU Delft, The Netherlands) and Volvo Group, a world-leading automotive company based in Gothenburg (Sweden). Research topics will include, but will not be limited to:

– adapting state-of-the-art system identification algorithms to use sparse datasets;

– uncertainty quantification and propagation in complex nonlinear systems;

– probabilistic methods for diagnosis and prognosis thresholds design and validation;

– sensitivity analysis of diagnosis and prognosis performances with respect to data sparsity.

The resulting methodologies and algorithms will be tested against real use cases provided by Volvo, where the candidates may spend a secondment period.

Requirements: the applicant should have obtained a M.Sc. degree in a field related to the project, such as Electrical or Electronics engineering, Systems & Control, Applied Mathematics, Mechanical engineering or Vehicle engineering. A good command of the English language is required. Candidates with a background in fault diagnosis/prognosis, automotive electric powertrains or probabilistic methods such as Polynomial Chaos Expansion or Gaussian Process Regression are especially encouraged to apply.

Conditions of Employment: The position will start on January 1st 2021, and run for four years. The successful candidate will be enrolled in the University graduate school. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities. Candidates actually in the process of obtaining their M.Sc. degree can be considered subjected to the condition of having completed it no later than the agreed starting date.

About Delft University of Technology: TU Delft is an internationally recognized research university with over 20,000 students and 3,300 staff scientists. Its high-quality teaching standards and experimental facilities are renowned, placing it among the 6 top universities in Europe and top 21 in the world in the Engineering and Technology field (Times Higher Education 2020). TU Delft is an equal opportunity employer and committed to increase the diversity of its staff.

Application and More Information: Please send your application as a single PDF file to application-3me@tudelft.nl, referencing the vacancy number TUD00496 and including: a motivation letter, a curriculum vitae, a research statement, a list of publications, transcripts of courses with grades and obtained degrees, contact information for two academic references and up to 3 research-oriented documents (e.g. thesis, conference/journal publication) to application-3me@tudelft.nl. Dr. Riccardo Ferrari (r.ferrari@tudelft.nl) can be contacted for more information about this vacancy. The deadline for ensuring full consideration of an application is October 31st, 2020, but the position will remain open until filled.

### 6.5. PhD: University of Sannio, Italy
Contributed by: Valerio Mariani, vmariani@unisannio.it

PhD positions available at GRACE, University of Sannio, Italy - Path planning and software technologies for drone control simulation and validation

GRACE, the Group of Research on Automatic Control Engineering, Dept. of Engineering (https://www.ding.unisannio.it/), University of Sannio, Benevento, Italy, has 4 tenured professors (internationally recognised), 2 Post-Doc researchers, 11 PhD students; its research activities deal with the theory of automatic control, optimisation, dynamic programming and approximate dynamic programming, and

on their application on a variety of fields, from automotive, to energy systems, to drone navigation, just to mention a few. The next call for PhD positions will be published soon on the portal www.unisannio.it

PhD Fellowship funded by ECSEL JU project COMP4DRONES (https://www.comp4drones.eu/) with focus in path planning and software technologies for drone control simulation and validation. PI: prof. Luigi Iannelli (luigi.iannelli@unisannio.it)

The objective of the project is to deliver a framework of enabling technologies for safe and autonomous drones and made up of components ranging from software to electronics, integrated into a unified architecture and a corresponding toolchain.

The University of Sannio is in charge of delivering a software environment where a user can both design and implement the desired control strategies and validate them in a virtual representation of the target environment.

The PhD student will work on the project full-time, keeping up with the release schedule, participating to the project meetings, presenting the carried out work, contributing to the deliverables and proposing improvements to the state-of-the-art path planning algorithms and techniques aimed to scientific publications. The PhD student will have also to attend the courses offered by the University of Sannio and by other universities whenever they are relevant to the required background.

Interested applicants should have the following qualifications:
- MS in
- Control Systems Engineering, or
- Electrical/Electronic Engineering, or
- Computer Science, or
- Applied Mathematics, or
- similar
- a solid set of GPA, TOEFL, and GRE scores.

Required (r)/ welcome (w) skills are:
- Automatic Control (r)
- Matlab/Simulink (r)
- Git (r)
- Linux (r)
- C/C++ (r)
- X-in-the-Loop (w)
- Python (w)
- ROS (w)
- Gazebo (w)
- Optimization (w)

Required documents:
- CV

• motivational letter

Recommendation letters are welcome (not to be included; to be sent directly to the University administration, as prescribed in the call). Interested candidates should get in touch with the PI and dr. Valerio Mariani (vmariani@unisannio.it).

### 6.6. PhD: University of Sannio, Italy
Contributed by: Valerio Mariani, vmariani@unisannio.it

PhD positions available at GRACE, University of Sannio, Italy - Control and optimization of energy communities with internal and external markets

GRACE, the Group of Research on Automatic Control Engineering, Dept. of Engineering (https://www.ding.unisannio.it/), University of Sannio, Benevento, Italy, has 4 tenured professors (internationally recognised), 2 Post-Doc researchers, 11 PhD students; its research activities deal with the theory of automatic control, optimisation, dynamic programming and approximate dynamic programming, and on their application on a variety of fields, from automotive, to energy systems, to drone navigation, just to mention a few. The next call for PhD positions will be published soon on the portal www.unisannio.it

PhD position on Control and Optimization of Energy Communities. PI: prof. Luigi Glielmo (glielmo@unisannnio.it).

The objective of the research activities is the study and the developments of algorithms for control and optimization of energy communities with internal and external markets. The activities could be included in possible projects on the same topic.

The PhD student will work on the topic full-time, carrying out his/her tasks autonomously and delivering intermediate results through presentations, reports and periodic meeting with the supervisors. The student will have to investigate all the relevant aspects of energy communities and optimal control techniques that can be applied effectively. Extensions to the state-of-the-art will have to be achieved resulting in publications in major journals and possibly testing in lab or case studies. In case of involvement into related project, the student will also have to keep up with the release schedule, participating to the project meetings, presenting the carried out work to the other partners, contributing to the deliverables.

The PhD student will have also to attend at the courses offered by the University of Sannio and by other university whenever they are relevant to the required background. Interested applicants should have the following qualifications:

• MS in
• Control System Engineering, or
• Electrical/Electronic Engineering, or
• Computer Science, or
• Applied Mathematics, or
• similar

• a solid set of GPA, TOEFL, and GRE scores

Required (r)/ welcome (w) skills are:

• Linear dynamical systems (r)
• Automatic Control, classical techniques (r)
• Matlab/Simulink (r)
• Optimal control (w)
• Micro/Smart Grids (w)
• Power Systems (w)
• MPC (w)
• Optimization (w)
• MILP (w)
• Game Theory (w)
• Optimization platforms (w)
• X-in-the-Loop (w)
• C/C++ (w)
• Python (w)
• GIT (w)

Required documents:
• CV
• motivational letter

Recommendation letters are welcome (not to be included; to be sent directly to the University administration, as prescribed in the call). Interested candidates should get in touch with the PI and dr. Valerio Mariani (vmariani@unisannio.it).

### 6.7. PhD: KTH Royal Institute of Technology, Sweden
Contributed by: Cristian R. Rojas, crro@kth.se

PhD position: Machine Learning in Healthcare

KTH Royal Institute of Technology in Stockholm has grown to become one of Europe's leading technical and engineering universities, as well as a key centre of intellectual talent and innovation. We are Sweden's largest technical research and learning institution and home to students, researchers and faculty from around the world. Our research and education covers a wide area including natural sciences and all branches of engineering, as well as architecture, industrial management, urban planning, history and philosophy.

Project description: We seek a Doctoral student for an interdisciplinary collaborative project, funded by the Strategic Research Environments ICT-TNG and Digital Futures, which involves KTH, RISE and Stockholm University. The project involves the development of state-of-the-art machine learning techniques, in particular, inverse reinforcement learning, to analyze and reverse engineer healthcare data and provide

diagnosis and recommendations of treatments for patients. This goal lies at the intersection of several disciplines, including machine learning, time series analysis, privacy and trust (from a legal perspective) and how humans understand and interpret data. The PhD studies will include the analysis, design and implementation of algorithms, and potentially their use on actual healthcare data.

What we offer:
- The possibility to study in a dynamic and international research environment in collaboration with industries and prominent universities from all over the world.
- A workplace with many employee benefits and monthly salary according to KTH's Doctoral student salary agreement.
- A postgraduate education at an institution that is active and supportive in matters pertaining to working conditions, gender equality and diversity as well as study environment.
- Work and study in Stockholm, close to nature and the water.
- Help to relocate and be settled in Sweden and at KTH.

Eligibility: The applicant must have basic eligibility in accordance with either of the following:
- passed a degree at advanced level,
- completed course requirements of at least 240 higher education credits, of which at least 60 higher education credits at advanced level, or in any other way acquired within or outside the country acquired essentially equivalent knowledge.
- Requirements for English equivalent to English B/6, read more here.
- The successful applicant is expected to hold an MSc degree in Electrical Engineering, Engineering Physics, Computer Science, Mathematics or equivalent.

Applicants should have an outstanding academic track record, and well developed analytical and problem solving skills, as well as solid mathematical and programming skills. We are looking for a strongly motivated person, who is able to work independently. Good command of English orally and in writing is required to publish and present results at international conferences and in international journals.

After the qualification requirements, great emphasis will be placed on personal qualities and personal suitability.

Application: Apply for the position and admission through KTH's recruitment system:
https://kth.varbi.com/en/what:login/jobID:350810/type:job/where:4/apply:1/
Applications must include the following elements (as a single PDF file):
- CV including your relevant professional experience and knowledge.
- Application letter with a brief description of why you want to pursue research studies, about what your academic interests are and how they relate to your previous studies and future goals. (Maximum 2 pages long)
- Copies of diplomas and grades from previous university studies and certificates of fulfilled language requirements (see above). Translations into English or Swedish if the original document is not issued in one of these languages.
- Representative publications or technical reports. For longer documents, please provide a summary (abstract) and a web link to the full text.

For more information, please see:

https://www.kth.se/en/om/work-at-kth/lediga-jobb/what:job/jobID:350810/where:4/

### 6.8. PhD: Lund University, Sweden
Contributed by: Anders Rantzer, rantzer@control.lth.se

PhD positions, Lund University, Sweden

Several positions for PhD students in Automatic Control are announced. Application deadline November 1. See http://www.lth.se/english/work.

### 6.9. PhD: Louisiana State University, USA
Contributed by: Michael Malisoff, malisoff@lsu.edu

PhD positions available at Louisiana State University

Ph.D. positions are available at Louisiana State University (LSU) in Baton Rouge, LA, to work on a newly funded NSF project on advanced applied nonlinear control. We welcome applications from qualified candidates with degrees in mathematics, electrical engineering, mechanical engineering, or closely related fields.

Preference will be given to students having a good background in control theory who are motivated to do cutting-edge research in ecological robotics and event-triggered control and who possess strong computing skills. Interested applicants are encouraged to contact Prof. Malisoff through malisoff@lsu.edu and include their CVs and transcripts in their first communications. LSU is the flagship university of the State of Louisiana and offers a vibrant highly research active environment that is welcoming to a diverse, highly qualified cadre of students.

### 6.10. PhD: Imperial College London, UK
Contributed by: Dario Paccagnan, d.paccagnan@imperial.ac.uk

PhD Position in Future Mobility Systems: design and societal impact

Topic and Requirements: Imperial College London seeks PhD candidates that are excited to shape the next generation of mobility systems and shed light on their societal impact. Towards this goal, you will be working under the supervision of Dr Dario Paccagnan (https://bit.ly/2S4HUyw), develop and analyze theoretically-sound tools/models/algorithms. The deadline for applying is November 6. Further details can be found HERE https://bit.ly/2GggGly and in the following.

Autonomous Mobility on Demand - a mode of transportation wherein fleets of self-driving vehicles transport passengers on demand within a city - is forecasted to revolutionize the way we move. Yet its impact on our society is not fully understood. For example, how will autonomous vehicles integrate with the existing public transportation infrastructure? Will competition between multiple operators worsen the congestion?

You will have the opportunity to tackle these questions (and many more) in a principled way, and at the same time develop novel tools and algorithms to shape the future of intelligent transportations systems. As the interests of different parties are involved (e.g., traffic authority, municipalities, systems' oper- ators), you will exploit models and tools in game theory, optimization, control theory.

To apply for this position, we are looking for outstanding PhD candidates with a strong mathematical / computer science background. Familiarity with any of the following is desirable: convex optimization, algorithms, game theory, control theory.

Applicants are expected to have a First Class or Distinction Masters level degree, or equivalent, in Computer Science, Applied Mathematics, Systems and Control, Electrical or Mechanical Engineering. Applicants must be fluent in spoken and written English. The position is fully funded, covering tuition fees, travel funds and a stipend.

How to Apply: Informal inquiries about this position are encouraged and can be directed to Dr Dario Paccagnan. To apply for this position, please follow the application guidelines. In the application form, please write Future Mobility Systems in the "Proposed Research Topic" field, and Dr Dario Paccagnan in the "Proposed Research Supervisor" field. This position is based at South Kensington in central London. Applicants are advised to visit the departmental webpage for general information on becoming a PhD student in the Department of Computing.

We are committed to equality and valuing diversity. We are also an Athena SWAN Silver Award winner, a Stonewall Diversity Champion, a Two Ticks Employer, and are working in partnership with GIRES to promote respect for trans people.

### 6.11. PhD: The University of British Columbia, Canada
Contributed by: Ahmad W. Al-Dabbagh, ahmad.aldabbagh@ubc.ca

PhD and MASc: The University of British Columbia (Okanagan campus), Kelowna, Canada
Start Date: May 2021 or September 2021

Dr. Ahmad W. Al-Dabbagh is looking to recruit several graduate students to join his group at the Okanagan campus of the University of British Columbia (ranks among the 40 best universities in the world). The students should be self-motivated and eager to perform excellent research in relation to the following themes:
1. Networked cyber-physical systems - such as fault diagnosis, cyber security, and event-triggered communication and control; and/or
2. Process data analytics - such as abnormality diagnosis, alarm management, and causality inference and forecasting.

For further details, prospective applicants are encouraged to visit https://olcsr.ok.ubc.ca. For consideration, prospective applicants can email Dr. Al-Dabbagh at ahmad.aldabbagh@ubc.ca.

### 6.12. PhD: TU Delft, The Netherlands
Contributed by: Sergio Grammatico, s.grammatico@tudelft.nl

PhD position: Game-theoretic Control for Multi-Vehicle Automated Driving

I am looking for 1 talented, outstanding PhD researcher with a Master degree (or close to completion) in Systems and Control, or Applied Mathematics, or related field, with theoretical background and/or interest in System Theory, Automatic Control, Optimization, Game Theory, and with good command of the English language (knowledge of Dutch is not required).

General project description: The candidate will conduct theoretical and algorithmic research on multi-agent control for multi-vehicle multi-lane automated driving. The research will develop and build upon tools from game theory and mixed-integer optimization. The position is in the context of the research project "Artificially Intelligent Multi-Vehicle Automated Driving Systems" (AMADeuS), funded by the Netherlands Organisation for Scientific Research (NWO) domain Applied and Engineering Sciences (TTW).

General project abstract:
https://www.nwo.nl/onderzoek-en-resultaten/programmas/ttw/open-technologie-programma/2020---18489.html

Conditions of employment: The PhD appointment will be for 4 years. The PhD student will participate in the training and research activities of the TU Delft Graduate School and of the Dutch Institute of Systems and Control (DISC). The PhD students will receive a competitive salary in accordance with the Collective Labour Agreement for Dutch Universities (CAO), from about 2.3k EUR/month (gross, 1st year) to 2.9k EUR/month (gross, 4th year), possibly from 1.8k EUR/month (after taxes, 1st year) to 2.1k EUR/month (after taxes, 4th year), plus holiday allowance (8% of gross annual income) and end-of-year allowance (8.3% of gross annual income), travel budget, secondary benefits, discounts for health insurance and sport membership.

Applications shall include the following documents:
- curriculum vitae;
- statement of motivation and research interests (up to one page);
- transcripts of all exams taken and obtained degrees (in English);
- names and contact information of up to three references (e.g. project/thesis supervisors);
- up to 3 research-oriented documents (e.g. thesis, conference/journal publication).

Applications or inquires shall be emailed to prof. Sergio Grammatico (s.grammatico@tudelft.nl). The call for applications will remain open until the ideal candidate is found. The starting date is flexible.

### 6.13. PhD: Lulea University of Technology, Sweden
Contributed by: George Nikolakopoulos, geonik@ltu.se

Two PhD positions on Robotics

Luleå University of Technology is experiencing strong growth with world leading competence in several areas of research. Our research is conducted in close collaboration with industries such as Bosch, Ericsson, Scania, LKAB, SKF and leading international universities. Luleå University of Technology has a total turnover of SEK 1.8 billion per year. We currently have 1,700 employees and 15,100 students. We shape the future through innovative education and groundbreaking research. Drawing on our location in the Arctic region, we create global societal benefit.

The Robotics and Artificial Intelligence (RAI) (www.ltu.se/robotics) subject at the department of Computer Science and Electrical and Space Engineering at Luleå University of Technology, is now looking for two PhD students contributing to our growing activities. The RAI team is conducting fundamental research in all the aspects of robotics with a specific focus on aerial, space and bioinspired robotics. The vision of RAI is aiming in closing the gap from theory to real life, while the team has a strong expertise in field robotics. Specific application areas of focus are robotics for mines, aerial inspection of aging infrastructure, multi-robotic search and rescue, multi sensorial fusion and multirobot coordination, including multirobot perception, decentralization and mission execution. The RAI team has a strong European participation in multiple R&D&I projects, while RAI is also participating in the DARPA SUB-T challenge with the CoSTAR Team lead by NASA/JPL (https://costar.jpl.nasa.gov/) and has an R&D research agenda with HONDA Research Institute in Japan (https://www.jp.honda-ri.com/en/).

Research topics: The PhD candidates will be working in the field of aerial robotics and their activities will be linked with European R&D Projects and the SubT challenge in the general field of multi-vehicle collaborative perception and exploration of unknown and non-structured areas (Tunnels, Urban and Caves). The research topic is in the area of Robotics and Artificial Intelligence. More specifically, the position will involve dense research activities in the area of designing, experimenting and theoretical control development in the area of UAVs. The specific two research topics include:

Research Topic #1 AI based Robotics
- Reinforcement learning for collaborative aerial team deployment
- Advanced AI for mission planner for team of hybrid robots
- Deep learning for localization
- Multi sensor fusion framework
- Transfer learning for team of hybrid robots
- Reconfigurable network configuration with team of aerial robots

Research Topic #2 Perception based Robotics
- Collaborative vision for robotics
- Collaborative Mapping and Exploration
- Simultaneous localization, path planning and exploration
- Image enhancement for robotics

• Object detection and localization for aerial robots

Qualifications: To be qualified for the position, the applicant must have a MSc degree in Electrical or Mechanical Engineering or Computer Science or related subject. The candidate will need to represent the group in different occasions, both in Sweden and world-wide. Perfect scientific skills with excellence in real life experimentation, as well as very good communication skills are considered as a strong plus.

Tasks: The candidate will perform research with substantial theoretical and experimental components that should be published in peer-reviewed major international journals and at major conferences. The position will include supervision of MSc and to assist in grant applications from research funding agencies/councils, the EU framework program or the industry. The position might also involve teaching assistance, seminars and presentations.

Information: For further information please contact Chaired Professor George Nikolakopoulos +46 920 491298, geonik@ltu.se

Application: We prefer that you apply for this position by clicking on the apply button below. The application should include a CV with a full description of all the scientific merits of the candidate, motivation letter, list of 2 persons that could provide recommendation for the candidate and copies of verified and translated diplomas from high school and universities. Your application must be written in English. Mark your application with the reference number below.

Final day to apply: 14 October, 2020, Reference number: 3270-2020
URL to this page https://www.ltu.se/ltu/Lediga-jobb?l=en&rmpage=job&rmjob=4067&rmlang=UK

### 6.14. PhD: Purdue University, USA
Contributed by: Ran Dai, randai@purdue.edu

Ph.D. Positions in Computational Optimization and Robotics at Purdue University

Two graduate assistant positions are available in the area of Computational Optimization and Robotics in the School of Aeronautics and Astronautics at Purdue University. Qualified candidates with degrees in aerospace engineering, electrical engineering, applied mathematics, or closely related fields are encouraged to apply. Preference will be given to students who have experience in either of the two following areas:
1- Optimal control of autonomous systems.
2- Designing and building hardware of unmanned ground and aerial vehicles.

The selected students will be offered a scholarship to cover his/her full-time tuition and a monthly stipend commensurate with his/her credentials. All interested applicants must apply directly through Purdue's online application system at https://gradapply.purdue.edu/apply/, and are strongly suggested to send a copy of his/her application materials including resume, academic transcript and/or research reports/papers to Dr. Ran Dai at randai@purdue.edu.

### 6.15. PhD: Eindhoven University of Technology, The Netherlands
Contributed by: Carlos Murguia and Nathan van de Wouw, c.g.murguia@tue.nl

PhD position in Privacy-Preserving Online Equipment Monitoring for High-Tech Systems

The Dynamics and Control (D&C) group at Eindhoven University of Technology (TU/e), The Netherlands, is looking for a talented PhD candidate to work on developing analysis and synthesis tools for privacy-preserving online equipment monitoring for high-tech systems.

Context and Project Description: Technology companies today manufacture and sell high-tech equipment capable of measuring, processing, and transmitting operational data in real-time over the cloud. Companies collect data of the day-to-day operation of equipment to monitor the life and proper operation of their products. Online equipment monitoring allows them to forecast failures and schedule maintenance before a critical fault (event) occurs. However, sharing operational data might not be attractive to end-users as private/sensitive information of the products (services) they manufacture (provide) could be disclosed. There are two potential privacy threats in this setting: 1) the customer does not wish the manufacturer (service provider) to infer certain information (e.g., manufactured products specs); and 2) it is the communication channel itself (e.g., the internet), what the customer does not trust. Conversely, online equipment monitoring extends the life of equipment, decreases production bottlenecks, and prevents high and unexpected costs. That is, we have two opposite aspects here, customers would like to share data to improve performance but they do not want to share it for privacy reasons. It is therefore attractive for both parties (customers and manufacturers) to have masking mechanisms that allow for: 1) coding operational data before disclosure so that private information is hidden (in some appropriate sense); and 2) the coded data to be used by the manufacturer (service provider) to detect faults and schedule maintenance.

The broad goal of this project is to develop fundamental systems, control, and information theoretic tools that allow constructing privacy-preserving online equipment monitoring for high-tech systems. We aim at synthesizing real-time fault detection algorithms that, on the one hand, satisfy the required prescribed detection performance; and, on the other hand, guarantee a private exchange of system data over (potentially untrusty) communication networks. The main research questions to be addressed in the project are: Depending on the class of systems under study (e.g., linear, nonlinear, stochastic, hybrid, etc.), how to properly select privacy metrics that make sense from the point of view of dynamical systems? Given a particular privacy metric and a fault detection scheme, how to quantify the privacy level (information leakage) provided by the detection scheme? And, what synthesis tools can be used to systematically design coding functions and fault detection algorithms to maximize privacy and guarantee prescribed detection performance?

Eindhoven University of Technology (TU/e) is a research-driven university of international standing, where excellent research and excellent education go hand in hand. We focus on a balanced approach towards education, research and valorization of knowledge in the areas of engineering science and technology. From our lively campus, situated in the heart of the high-tech Brainport region and equipped with high-quality lab facilities, we make an impact on scientific and societal issues. To achieve this, we collaborate closely with other universities, scientific institutes, social organizations, government, and industry. We combine top-notch fundamental research with an application-oriented educational approach, characterized by frequent and intensive student-teacher interaction. This is all part of a tight-knit, small-scale community consisting

of more than 80 nationalities, where everyone feels welcome and where the well-being of students and staff matters.

Dynamics and Control Group: The Dynamics and Control (D&C) group at TU/e trains the next-generation of students to understand and predict the dynamics of complex engineering systems in order to develop advanced control, estimation, planning, and learning strategies which are at the core of the intelligent autonomous systems of the future. Autonomous vehicles, fully automated industrial value chains, high-tech systems, collaborative robots in unstructured environments, intelligent medical devices, automated transportation networks, soft robotics, together with sustainable automotive technology are key examples of the broad application domain of the (D&C) group. The design of these systems requires a thorough understanding of their underlying dynamics. Therefore, the first focal point of our research is on both data-based and first-principles-based modelling, model complexity management, and dynamic analysis of complex, multi-physics and multi-disciplinary engineering systems. Building on this foundation, our second focal point is on "making autonomous systems smarter". To this end, we develop both model- and data-based sensing, planning, and learning and control technologies to provide autonomous systems with the intelligence needed to guarantee performance, robustness, and safety. Combining the investigation on both dynamics and control theory in one section allows to take on these challenges standing in a privileged position. In particular, it enables us to educate uniquely skilled engineers and researchers as well as to valorize our research together with the high-tech, automotive and energy sectors.

Brainport Eindhoven Region: The Brainport Eindhoven is a world-class top technology region, in which companies, governments, and educational institutions (the so-called triple helix collaboration) work together on advancing technology for humanity. Brainport Eindhoven is among Europe's most prominent and innovative high-tech centers, where high-tech and design are combined with high-end manufacturing industry and entrepreneurship. Geographically situated in the southern part of the Netherlands, the Brainport region has a workforce of 400,000 people from all over the world working on high-tech solutions in areas such as health, mobility, energy, and nutrition. The region generates, by far, the most patents per thousand inhabitants in the world.

Job Requirements: We are looking for a recently graduated, talented, and enthusiastic candidate who meets the following criteria:
- Master of Science degree (or an equivalent university degree) in Mechanical or Electrical Engineering, Computer Science, Applied Physics, Applied Mathematics, Robotics, or related disciplines.
- Strong analytical skills.
- Strong Matlab programming skills.
- Fluent in spoken and written English.
- Experience in model-based fault detection and control schemes for dynamical systems is a plus.

Conditions of Employment
- A meaningful job in a dynamic and ambitious university with the possibility to present your work at international conferences.
- A full-time employment for four years, with an intermediate evaluation after one year.
- To support you during your PhD and to prepare you for the rest of your career, you will have free access to a personal development program for PhD students (PROOF program).
- A competitive monthly salary in accordance with the Collective Labor Agreement for Dutch Universities.

- Additionally, an annual holiday allowance of 8% of the yearly salary, plus a year-end allowance of 8.3% of the annual salary.
- A broad package of fringe benefits, including an excellent technical infrastructure, moving expenses, and savings schemes.
- Family-friendly initiatives are in place, such as an international spouse program, and excellent on-campus children day care and sports facilities.

More information: Do you recognize yourself in this profile and would you like to know more? Please contact Dr. Carlos Murguia, c.g.murguia@tue.nl.

We invite you to submit a complete application by email to c.g.murguia@tue.nl. The application should include:
- Cover letter in which you briefly describe your motivation and qualifications for the position;
- Curriculum vitae, including a list of your publications (if any) and the contact information of three references;
- MSc transcript indicating courses taken (including grades);
- Brief description of your MSc thesis.

We look forward to your application and will screen it as soon as we have received it. Screening will continue until the position has been filled.

### 6.16. PhD: University of Kentucky, USA
Contributed by: Xu Jin, xu.jin@uky.edu

Ph.D. Positions in intelligent control (Mechanical Engineering) at the University of Kentucky

Ph.D. openings are available in the Department of Mechanical Engineering at the University of Kentucky, Lexington, KY, in Dr. Xu Jin's group on the topics of intelligent control. We look for excellent students with the following one or more background areas:
1. Adaptive control
2. Iterative learning control
3. Nonlinear systems and control
4. Vision-based control
5. Ground vehicles (include unicycle-type robots)
6. Quadrotors
7. Robot manipulation systems
8. Multiagent/interconnected/networked/cyber-physical systems

More research details can be found on Dr. Xu Jin's website: https://www.engr.uky.edu/directory/jin-xu and the external links included. The positions include stipend, health care, and tuition support. The offers are valid for two years, and renewable for additional years based on performance of the students. Qualifications: The applicants MUST ALREADY HAVE, or will soon have the GRE and TOEFL test scores (if applicable) meeting the departmental minimum requirement.

How to apply: Applications should be emailed to Dr. Xu Jin at xu.jin@uky.edu as soon as possible. Please include a full CV (including GRE and TOEFL scores if applicable), PDFs of relevant publications, and names of at least three references. Upon initial email discussions, those who are encouraged to apply should then apply to the department as soon as possible, and indicate my name (Dr. Xu Jin) in the application package. Visiting Ph.D. students and scholars are also very welcomed for self-funded research visit for 6-24 months.

* Short note about the department and the city: Mechanical Engineering is the largest department in the College of Engineering with 35 tenured and tenure-track faculty members, over 1,000 undergraduate students, and over 120 graduate students. The department also has state-of-the-art computational facilities, research labs, and classrooms, including UAV, ground robot, and air table satellite testing facilities. The city of Lexington is ranked #3 Best City to Raise a Family, #4 City with Best Tech Career Potential, # 8 City with the Lowest Living Cost, # 21 Best Places to Live in America, and # 31 Most Educated Cities in America. Located in the heart of the Bluegrass Region, Lexington is known as the "Horse Capital of the World".

### 6.17. PhD/Postdoc: University of Vermont, USA
Contributed by: Hamid Ossareh, hossareh@uvm.edu

Title: Post-doctoral and PhD Vacancies in Control Theory at the University of Vermont

The Autonomous and Intelligent systems Research Lab (AIR Lab) in conjunction with the Vermont Energy Center for ConTrol and Optimization of Resilient Systems (VECTORS) invites applications for a postdoctoral researcher and a PhD student in the area of dynamics and control with application to satellite swarms. These hires will work with faculty, students, and researchers at the University of Vermont, Benchmark Space Systems, and the Jet Propulsion Laboratory (JPL), on a NASA-sponsored project on coordination, estimation, and real-time control of satellite swarms. Expected start date for both positions is January 2021.

Desired qualifications for the post-doctoral researcher includes a demonstrated track record of publications with expertise in at least three of the following areas:
- Linear and nonlinear control theory
- Estimation and filtering
- Predictive control and optimization theory
- Orbital mechanics and satellite dynamics

Competitive salary and benefits are included plus living in (or near) beautiful Burlington, Vermont. The candidate will enjoy a dynamic and collaborative working environment.

Desired qualifications for the PhD student includes a GPA of 3.5 and publications in peer-reviewed conferences and journals. For those applying internationally, a minimum TOEFL score of 100 or an IELTS score of 7.0 is required. This PhD position is fully funded and comes with competitive salary and benefits.

Interested applicants must email Professor Hamid Ossareh (hossareh@uvm.edu) the following:
i) your updated curriculum vitae (CV);
ii) a brief 1-paragraph statement of why you believe you are a good fit for the position;
iii) contact information of three professional references;

iv) Post-doc applicants should submit a brief 1-paragraph summary of your Ph.D. dissertation topic.

Applicants who do not follow the above format will not be considered for this position.

### 6.18.  PhD/Postdoc/Engineer: City University of New York, USA

Contributed by: Hao Su, haosu.robotix@gmail.com

Postdoc, Engineer, PhD Student Positions: Learning and Control of Legged Robots and Soft Robots at City University of New York

The Biomechatronics and Intelligent Robotics Lab at the City University of New York (CUNY), City College is seeking multiple post-doc fellows, engineers, and PhD students with Dynamics/Control OR Learning OR Mechatronics expertise for applications in soft robots, wearable robots, and legged robots. The postdoc position is in New York City and jointly affiliated with CUNY and National Institutes of Health (NIH). The lab is comprised of 4 postdocs and 5 PhD students. Our research is sponsored by National Institutes of Health R01, NSF CAREER award, and Toyota Mobility Foundation. We won the Innovation Challenge of Wearable Robotics Association, semi-finalist of Cisco Global Problem Solver Challenge, and Toyota Mobility Challenge Discovery Award.

Our paper on soft robots is published in Science Advances (impact factor 13). The selected candidate will join a multidisciplinary research team to study high-performance motors, control of soft robots and legged robots in collaboration with CMU, Columbia University Medical Center, Cornell University, and several top medical schools in the United States. This is a great opportunity to pioneer research in a new generation of wearable, legged, and soft robot platforms to publish high-impact papers alongside several PIs who have expertise in mechatronics, computer vision, and machine learning.

Postdoc Qualification:
- PhD in Mechanical, Electrical Engineering, Robotics, Computer Science, or related areas including
- Strong hands-on experience
- Dynamics and control of robotic systems, including soft, wearable, humanoid, or legged robots
- Machine learning, reinforcement learning, and learning-based control
- Mechanical design of wearable robots, soft robots, humanoid, legged robots. Experience in actuator design, cable transmission, hydraulics, pneumatics or is a plus
- Strong interpersonal and organizational skills needed to participate as a creative member of a growing research team.

PhD students can be admitted in 2020 fall (application deadline 2020 July). PhD students will receive tuition scholarship and stipend support. Students are required to have GRE and TOEFL (or IELTS).

** About the lab and City University of New York **
The Biomechatronics lab is a 1500 sq. ft. facility with the latest generation motion capture system, humanoid platforms, state of the art physiology measurement devices, cameras, IMUs, high-performance motors, and more. The lab is a vibrant workplace; students can work on a diverse set of projects, conduct hands-on

experiments, and publish high-quality papers.

Applications (assembled as a single PDF file) should contain a CV, a list of publications, and copies of up to four scientific papers. Applications should be emailed to Prof. Hao Su (hao.su at ccny.cuny.edu).

Hao Su, Ph.D.
Irwin Zahn Endowed Assistant Professor
Director, Lab of Biomechatronics and Intelligent Robotics
Department of Mechanical Engineering
City University of New York, City College
275 Convent Avenue New York, NY 10031
Web: haosu-robotics.github.io

### 6.19. Postdoc: Washington University Saint Louis, USA
Contributed by: ShiNung Ching, shinung@wustl.edu

Postdoctoral Position at Washington University in St. Louis

A postdoctoral position is open in the Department of Electrical and Systems Engineering at Washington University in the area of modeling, control and optimization of neural dynamics. The intended project focuses especially on the development of new theory regarding how certain cognitive functions are embedded within brain networks. This is a primarily theory-oriented project with an emphasis on normative or 'top-down' modeling. Some opportunities for working with neural data may develop. Relevant areas of expertise include: nonlinear dynamical systems and control, distributed optimization, learning methods, network theory and analysis. Note that a background in neuroscience is not required for this position, though the candidate should have an interest and/or curiosity about this area of research.

The position is open immediately. Interested applicants should send a CV and brief statement of interests to Prof. ShiNung Ching, shinung@wustl.edu

### 6.20. Postdoc: ETH, Switzerland
Contributed by Roy Smith:, rsmith@control.ee.ethz.ch

Post-doctoral Researcher Position (Modeling, Identification & Feedback Control)

The Automatic Control Laboratory (IfA) has an extensive research record in both the theory and application of control technology . Our research spans a broad range including theory, computation, and applications within many domains including energy, transportation, and robotics. We have three faculty members, (Profs. Dorfler, Lygeros & Smith), 8 postdoctoral researchers and over 30 Ph.D. students. We come from all over the world and the working language is English.

Project Background: The Automatic Control Laboratory is also one of the lead institutes in the newly formed National Centre of Competence in Research (NCCR) in Dependable Ubiquitous Automation. This

is a large research consortium supported by the Swiss National Science Foundation and involves 17 faculty members from three Swiss universities. The NCCR is growing and is expected to include approximately 30 Ph.D. and postdoctoral researchers. The research activities are collaborative and range from the theoretical foundations of optimisation, data science, information processing, and automatic control, through to computational tools and experimental testbeds. Research projects will typically involve multiple faculty and researchers. This Postdoctoral research position will be a part of the NCCR.

Project Description: The Postdoctoral Researcher will work with Prof. Roy Smith on topics of common interest within the domain of modeling, system identification and robust feedback control. We have a strong interest in combining data-driven and learning methods with control relevant modeling frameworks. You will also be expected to develop independent research directions of our own to support your future career in academic or industrial research. You will assist Prof. Smith with organisational and oversight responsibilities on NCCR projects. You are also expected to mentor and work with Ph.D. student researchers. For those interested in pursuing an academic career, there will also be opportunities to be involved in teaching and other educational activities. The position is funded for at least 2.5 years.

Your profile: You have (or are about to receive) a Doctoral degree in an engineering or physical sciences discipline from an internationally recognised university. You have published research experience in at least one of the following areas: feedback control systems, system identification, or data science. You have an analytical approach to your research and this is demonstrated in your publications. You have strong communication skills (both written and verbal) in English. You prefer working in an open, diverse and cooperative environment. You are interested in developing new research areas as well as helping more junior researchers develop their research skills.

To apply: Applications will only be accepted via the ETH Jobsite: https://bit.ly/33RTSAJ

If you have additional questions, please contact Prof. Roy Smith.

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### 6.21. Postdoc: TU Delft, The Netherlands
Contributed by: Riccardo Ferrari, r.ferrari@tudelft.nl

Postdoc position at Delft Center for Systems and Control, TU Delft (The Netherlands)

The Delft Center for Systems and Control (DCSC) at Delft University of Technology (TU Delft) in the Netherlands has vacancy for a PostDoc Position in "Health-aware control for offshore wind turbines and wind farms"

Background:. Offshore Wind Farms (WF) are gaining prominence due to the increasing interest inrenewable energy. The harsh offshore operating conditions favour the occurrence of faults in Wind Turbines (WTs) components such as actuators, gearbox and converter, as well as fatigue and structural failures in blades and towers. As these phenomena may lead to costly failures of WTs, control algorithms should consider a WT health status and keep structural loads and stress or wear on components below an acceptable level. In this way, a WT residual useful life can be optimized, thus leading to lower energy costs.

Project Description: the successful candidate will be co-supervised by Dr. Riccardo Ferrari and Prof. Jan-Willem van Wingerden as part of the international project "AIMWind – Analytics for asset Integrity Management of Wind Farms". AIMWIND is a collaboration between the Delft Center for Systems and Control (TU Delft, The Netherlands), and the University of Agder and NORCE in Norway. The position will focus on developing fault-tolerant control laws, as well as structural load-limiting ones for individual WTs. At WF level, novel power dispatch algorithms will be developed with the aim of maximizing total power production while preventing to over-stress damaged WTs. While the proposed control algorithms will be developed using reduced-order models, they will be validated in medium or high-fidelity simulators, such as FAST Farm or SOWFA. Due to the uncertainty introduced by reduced order models, and the stochastic nature of the operating conditions faced by WTs, the work will also focus on uncertainty quantification and propagation.

Requirements: applicants should have the following qualifications: Ph.D. degree (or close to completion) in Systems and Control, Applied Mathematics, Mechanical Engineering, Electrical Engineering or a related field; strong mathematical skills, deep understanding of control systems theory, proficiency in numerical methods and interest to work at the intersection of System Theory and Renewable Energies; good programming skills; excellent command of English (Dutch not required); expertise in wind turbines modelling and control and in stochastic methods such as Polynomial Chaos Expansion or Gaussian Process Regression is highly appreciated.

Conditions of Employment: The position will start as soon as possible, but no later than February 2021, and run initially for one year, with the possibility of extension to a total of three years. Candidates in the process of obtaining their PhD degree can be considered subjected to the condition of having completed it no later than the agreed starting date.

About Delft University of Technology: TU Delft is an internationally recognized research university with over 20,000 students and 3,300 staff scientists. Its high-quality teaching standards and experimental facilities are renowned, placing it among the 6 top universities in Europe and top 21 in the world in the Engineering and Technology field (Times Higher Education 2020). TU Delft is an equal opportunity employer and committed to increase the diversity of its staff.

Application and More Information: Please send your application as a single PDF file to application-3me@tudelft.nl, referencing the vacancy number TUD00494 and including: a motivation letter, a curriculum vitae, a research statement, a list of publications, transcripts of courses with grades and obtained degrees, contact information for three academic references and up to 3 research-oriented documents (e.g. thesis, conference/journal publication) to application-3me@tudelft.nl. All documents should be compiled into a single PDF file, and the vacancy number TUD00494 should be referenced. Dr. Riccardo Ferrari (r.ferrari@tudelft.nl) can be contacted for more information about this vacancy. The deadline for ensuring full consideration of an application is October 31st, 2020, but the position will remain open until filled.

### 6.22. Postdoc: Uppsala University, Sweden
Contributed by: Ayca Ozcelikkale, ayca.ozcelikkale@angstrom.uu.se

Postdoctoral Position - Decision Making with Limited Data using Artificial Intelligence

The position will be located at the Department of Electrical Engineering at the Signals and Systems Division. The position is a part of the strategic research area effort eSSENCE's PostDoc-program towards new e-science methods and tools for artificial intelligence in research.

Project Description: Success of machine learning (ML) and artificial intelligence (AI) methods typically rely on the availability of large amounts of data. This dependence on high amounts of data/interactions is an important handicap for applying the current AI approaches in data-limited scenarios, such as Internet-of-Things scenarios. This project will address this handicap of limited data. We will consider a framework that generates actions/policies so that a specific desired outcome is obtained by interacting with the surroundings. Our approach will be closely connected to probabilistic dynamical models and model based reinforcement learning

Duties: To conduct original research in the area of decision making under limited data using the ActInf framework, in particular i) develop novel, general-purpose, active inference based adaptive data collection, decision making and control strategies to optimize the overall inference and control performance under limited data, ii) reveal the trade-offs between data collection, decision making and control performance and provide guidelines for cost-efficient autonomous operation for various application scenarios.

The duties include theoretical analysis, algorithm design and implementation via software-based simulations, and reporting of the results in the form of technical papers. Participation in the undergraduate and/or graduate education and supervision of PhD students is also required.

Requirements: PhD degree or a foreign degree equivalent to a PhD degree in Electrical Engineering or Computer Science with a background in Automatic Control, Signal Processing, Machine Learning or Communications. The PhD degree must have been obtained no more than three years prior to the application deadline. The three year period can be extended due to circumstances such as sick leave, parental leave, duties in labour unions, etc.

A proven publication record in top-ranked journals or conferences is required. Emphasis will be placed on computer programming abilities together with a strong mathematical background where previous research in active inference or closely related areas such as probabilistic dynamical models, information theory, optimization theory or reinforcement learning will be beneficial.

Starting date: 2020-11-01 or as otherwise agreed. The complete announcement text, including what the application is expected to include can be found here: https://uu.varbi.com/en/what:job/jobID:352187/

For further information do not hesitate to contact Ayca Ozcelikkale, ayca.ozcelikkale@angstrom.uu.se or Anders Ahlen, anders.ahlen@signal.uu.se.

Application Instructions: Please submit your application by October 8, 2020 through Uppsala University's recruitment system which can be reached using the application link above. Note that applications by email cannot be considered and will be ignored.

### 6.23. Postdoc: TU Delft, The Netherlands
Contributed by: Sergio Grammatico, s.grammatico@tudelft.nl

PostDoc position: Game-theoretic Control for Systems of Hybrid Systems

I am looking for 1 talented, outstanding PostDoc researcher with a PhD degree (or close to completion) in Systems and Control, or Applied Mathematics, or related field, with theoretical background and/or interest in System Theory, Automatic Control, Optimization, Game Theory, and with good command of the English language (knowledge of Dutch is not required).

General project description: The candidate will conduct theoretical and algorithmic research on complex multi-agent hybrid systems controlled by strategic agents. The research will develop and build upon tools from game theory and operator theory. The main application areas are distributed control for smart power systems and multi-vehicle automated driving. The position is in the context of the research project "Game theoretic Control for Complex Systems of Systems" (COSMOS), funded by the European Research Council as an ERC Starting Grant.

Conditions of employment: The PD appointment will be for 3 years. The researcher will receive a competitive salary in accordance with the Collective Labour Agreement for Dutch Universities (CAO), from about 2.9k EUR/month (gross, 1st year) to 3.2k EUR/month (gross, 3rd year), possibly from 2.5k EUR/month (after taxes, 1st year) to 2.7k EUR/month (after taxes, 3rd year), plus holiday allowance (8% of gross annual income) and end-of-year allowance (8.3% of gross annual income), travel budget, secondary benefits, discounts for health insurance and sport membership.

Applications shall include the following documents:
- curriculum vitae;
- statement of motivation and research interests (up to one page);
- transcripts of all exams taken and obtained degrees (in English);
- names and contact information of up to three references (e.g. project/thesis supervisors);
- up to 3 research-oriented documents (e.g. thesis, conference/journal publication).

Applications or inquires shall be emailed to prof. Sergio Grammatico (s.grammatico@tudelft.nl). The call for applications will remain open until the ideal candidate is found. The starting date is flexible.

### 6.24. Postdoc: Lulea University of Technology, Sweden
Contributed by: George Nikolakopoulos, geonik@ltu.se

Two Post Doc positions on Aerial Robotics

Luleå University of Technology is experiencing strong growth with world leading competence in several areas of research. Our research is conducted in close collaboration with industries such as Bosch, Ericsson, Scania, LKAB, SKF and leading international universities. Luleå University of Technology has a total turnover of SEK 1.8 billion per year. We currently have 1,700 employees and 15,100 students.We shape the future through innovative education and groundbreaking research. Drawing on our location in the Arctic

region, we create global societal benefit.

The Robotics and Artificial Intelligence (RAI) (www.ltu.se/robotics) subject at the department of Computer Science and Electrical and Space Engineering at Luleå University of Technology, is now looking for two postdocs contributing to our growing activities. The RAI team is conducting fundamental research in all the aspects of robotics with a specific focus on aerial, space and bioinspired robotics. The vision of RAI is aiming in closing the gap from theory to real life, while the team has a strong expertise in field robotics. Specific application areas of focus are robotics for mines, aerial inspection of aging infrastructure, multi-robotic search and rescue, multy sensorial fusion and multirobot coordination, including multirobot perception, decentralization and mission execution. The RAI team has a strong European participation in multiple R&D&I projects, while RAI is also participating in the DARPA SUB-T challenge with the CoSTAR Team lead by NASA/JPL (https://costar.jpl.nasa.gov/) and has an R&D research agenda with HONDA Research Institute in Japan (https://www.jp.honda-ri.com/en/).

Research topics: As a post doc, you will be working in the field of aerial robotics and their activities will be linked with European R&D Projects and the SubT challenge towards collaborative field aerial inspection, surveillance and mapping.

Characteristic research topics will focus on, but not be limited to, the following areas:
- Intelligent AI fleet manager
- Reactive Navigation
- Data learning for situational awareness
- Edge computing for localization, mapping and path planning
- Multi sensor fusion

Qualifications: To be qualified, you must have a PhD in Automatic control or related subject. The research tasks require a solid mathematical background with proven advanced experimental capabilities and excellent programming skills (e.g. C++, ROS, etc.). You should have a strong vision to evaluate and demonstrate the research findings in real life operating conditions, in an approach to close the gap between pure theory and experimental verifications. You will need to represent the group in different contexts, both in Sweden and abroad and hence have excellent skills in English.

Tasks: You will perform research with substantial experimental components that should be published in peer-reviewed international journals and at major conferences. The position will include supervision of PhD and MSc students, teaching and supporting in acquiring funds for future research projects from research funding agencies/councils, EU framework program or industry.

Information: The employment is limited to 1 year with possibility to be extended 1 year. For further information please contact Chaired Professor George Nikolakopoulos +46 920 491298, geonik@ltu.se

Application: We prefer that you apply for this position by clicking on the apply button below. The application should include a detailed CV with a full description of all the scientific merits and publications of the candidate, motivation letter, a research plan with a description of the research topics, list of successful grant applications, list of 2 persons that could provide recommendation for the candidate and copies of verified and translated diplomas from high school and universities. Your application must be written in English.

Mark your application with the reference number below.

URL to this page https://www.ltu.se/ltu/Lediga-jobb?l=en&rmpage=job&rmjob=4061&rmlang=UK

### 6.25. Faculty: University of British Columbia, Canada
Contributed by: Ryozo Nagamune, nagamune@mech.ubc.ca

Faculty: University of British Columbia, Canada
Assistant, Associate and Full Professors in Mechanical Engineering

The Department of Mechanical Engineering at the University of British Columbia, Vancouver campus, invites applications for up to two tenure-track or tenured faculty at the rank of Assistant Professor, Associate Professor or Professor, starting July 1, 2021, or shortly thereafter. We welcome applications both from individuals who would engage with existing fields of strength in our department, and from those who would inspire new areas of growth.

Applicants must hold a Ph.D. (or equivalent) in Mechanical Engineering or a related discipline, and should demonstrate the potential to achieve excellence in research and teaching. Successful candidates will develop an independent, internationally recognized research program, teach at the undergraduate and graduate levels, supervise and mentor Master's and Ph.D. students, and provide service to the University and the community. Successful candidates are expected to register as a Professional Engineer in the Province of British Columbia.

Our department is committed to fostering interdisciplinary research. Many faculty in our department are collaborative members of partner institutions within UBC (such as the School of Biomedical Engineering and the Institute for Computing, Information and Cognitive Systems) and several have joint appointments with other units on campus. We are open to joint appointments in this hiring round.

UBC's Vancouver campus is situated at the tip of Point Grey on the unceded lands of the Musqueam people, surrounded by forest, ocean and mountains. Vancouver is consistently ranked as one of the most diverse cities in Canada, and one of the most livable cities in the world. UBC seeks to recruit and retain a workforce that is representative of Vancouver's diversity, to maintain the excellence of the University, and to offer students richly varied disciplines, perspectives and ways of knowing and learning.

All of our work is shaped by our values: professionalism and integrity; scholarship and teaching excellence; commitment to students; partnerships and collegiality; initiative, innovation, and willingness to change; community, the environment, and sustainability. We hold these values as an integral frame of reference to inform our decisions and actions at every level and in every situation.

Interested applicants should submit a CV, a list of four references, and research, teaching, and diversity statements. Applications must be submitted online at https://www.hr.ubc.ca/careers-postings/faculty.php (Job ID 38029); emailed applications will not be considered. Our department welcomes and encourages applications from members of marginalized groups. Accessibility or special consideration accommodations

are available on request for all applicants at all stages of the selection process. To confidentially request accommodations, please contact Mr. Rico Choi, Operations & HR Manager at rico.choi@mech.ubc.ca.

Review of applications will begin October 1, 2020; all applications received by November 15, 2020 will receive full consideration. In addition to this broad search in Mechanical Engineering, the department also has dedicated searches in Robotics (Job ID 38030) and Advanced Manufacturing (Job ID 38026). Please see the other advertisements on our website for details.

Details on Research Statement: Please include both information about your research expertise and experience and about your research plan as a new faculty member, including as appropriate current and potential collaborators (at UBC and elsewhere) and sources of funding.

Details on Teaching Statement: Your teaching statement should describe your teaching interests and experience at any and all scales from one-on-one tutoring to small group tutorials to teaching large section courses. Also, explain your teaching philosophy, including specific examples that have informed the evolution of that teaching philosophy.

Details on Diversity Statement: UBC's strategic plan identifies inclusive excellence as one of our key priorities. We welcome colleagues with the experiences and competencies that can contribute to our principles of equity, diversity, and inclusion throughout campus life. In your application, please include a statement describing your experience working with a diverse student body and your contributions to creating/advancing a culture of equity and inclusion on campus or within your discipline.

Equity and diversity are essential to academic excellence. An open and diverse community fosters the inclusion of voices that have been underrepresented or discouraged. We encourage applications from members of groups that have been marginalized on any grounds enumerated under the B.C. Human Rights Code, including sex, sexual orientation, gender identity or expression, racialization, disability, political belief, religion, marital or family status, age, and/or status as a First Nation, Metis, Inuit, or Indigenous person. All qualified candidates are encouraged to apply; however, Canadians and permanent residents of Canada will be given priority. All positions are subject to final budgetary approval.

### 6.26. Faculty: University of Bayreuth, Germany
Contributed by: Lars Gruene, lars.gruene@uni-bayreuth.de

Full Professor for Data Driven Dynamic Optimization and Control

The Faculty of Mathematics, Physics & Computer Science at the University of Bayreuth is currently seeking to appoint a Full Professor for Data Driven Dynamic Optimization and Control at pay grade W 3 (minimum salary per month: 7,217 euros) to commence as soon as possible. This is a permanent civil service position.

The incumbent will represent his/her subject area in both research and teaching. Applicants should have their research focus in the area of data-driven dynamic optimization and control or a related field. Of particular interest is the development of data-driven algorithms for the dynamic optimization and control of dynamic systems and their mathematical foundations, especially with applications in intelligent robotics

and/or battery technology. We are looking for a scholar who is internationally recognized in research in a related mathematical field. Appropriate applications with reference to continuous and discrete mathematics are equally welcome.

More information can be found on
https://www.uni-bayreuth.de/en/university/work-at-the-university/job-vacancies/professors/data-driven-dynamic/index.html

### 6.27. Faculty: Institute of Science and Technology, Austria
Contributed by: Institute of Science and Technology Austria, faculty.recruiting@ist.ac.at

Assistant Professor (tenure-track) and Professor positions in Computer Science and Data Science

The Institute of Science and Technology Austria invites applications for several open positions in all areas of computer science and data science. We especially welcome applications in statistics, machine learning, optimization, bioinformatics, scientific computing, computer systems, control theory, and robotics. IST Austria offers:
• A highly international and interdisciplinary research environment with English as working language on campus
• State-of the art facilities and scientific support services (www.ist.ac.at/scientific-service-units/)
• Competitive start-up package and salary
• Guaranteed annual base funding including funding for PhD students and postdocs
• Wide portfolio of career support
• Child-care facilities on campus

IST Austria (www.ist.ac.at) is an international institute dedicated to basic research and graduate education in the natural, mathematical, and computational sciences. The Institute fosters an interactive, collegial, and supportive atmosphere, sharing space and resources between research groups whenever possible, and facilitating cross-disciplinary collaborations. Our PhD program involves a multi-disciplinary course schedule and rotations in research groups, and we hire scholars from diverse international backgrounds. The campus of IST Austria is located close to Vienna, one of the most livable cities in the world.

Assistant professors receive independent group leader positions with an initial contract of six years, at the end of which they are reviewed by international peers. If the evaluation is positive, an assistant professor is promoted to a tenured professor. Candidates for tenured positions are distinguished scientists in their respective research fields and have at least six years of experience in leading a research group.

Please apply online at: www.ist.ac.at/jobs/faculty/. The closing date for applications is October 30, 2020.

IST Austria values diversity and is committed to equal opportunity. We strive for increasing the number of women, particularly in fields where they are underrepresented, and therefore we strongly encourage female researchers to apply.

**6.28. Faculty: California Institute of Technology, USA**
    Contributed by: Sydney Garstang and Richard Murray, sydney@caltech.edu, murray@cds.caltech.edu

CMS Tenure-Track Faculty Position, California Institute of Technology, Pasadena, CA, USA

The Computing and Mathematical Sciences (CMS) Department at the California Institute of Technology (Caltech) invites applications for tenure-track faculty positions. The CMS Department is part of the Division of Engineering and Applied Science (EAS), comprising researchers working in and between the fields of aerospace, civil, electrical, environmental, mechanical, and medical engineering, as well as materials science and applied physics. The Institute as a whole represents the full range of research in biology, chemistry, engineering, geological and planetary sciences, physics, and the social sciences.

Fundamental research in computing and mathematical sciences, and applied research which links to activities in other parts of Caltech, are both welcomed. A commitment to world-class research, as well as high-quality teaching and mentoring, is expected, and appointment as an assistant professor is contingent upon the completion of a Ph.D. degree in applied mathematics, computer science or related areas. The initial appointment at the assistant professor level is four years. Reappointment beyond the initial term is contingent upon successful review conducted prior to the commencement of the fourth year.

– Interviews will take place in January and February 2021.
– Applications will be reviewed beginning 22 October 2020 and all applications received before 1 December 2020 will receive full consideration.
– Applications received before 8 November will be considered for interviews in January.
– Applications received after 8 November will be considered for interviews in February.

To fulfill Caltech's commitment to promoting diversity, inclusiveness, and excellence in research on our campus, we actively seek candidates who can work with, teach, and mentor students from under-represented communities. Along with other standard application materials, applicants should submit a diversity and inclusion statement that discusses past and/or anticipated contributions to improving diversity, equity, and inclusion in the areas of research, teaching, and/or outreach.

For a list of all documents required, and full instructions on how to apply online, please visit https://applications.caltech.edu/jobs/cms. Questions about the application process may be directed to search@cms.caltech.edu.

Caltech is an equal opportunity employer and all qualified applicants will receive consideration for employment without regard to age, race, color, religion, sex, sexual orientation, gender identity, national origin, disability status, protected veteran status, or any other characteristic protected by law.

**6.29. Faculty: University of Bath, UK**
    Contributed by: Mark Opmeer, m.opmeer@bath.ac.uk

Faculty: University of Bath, United Kingdom: Lecturer (Assistant Professor) in Applied Mathematics

The Department of Mathematical Sciences at the University of Bath is inviting applications for an appointment to two Lecturer (Assistant Professor) positions in Applied Mathematics. We are seeking applicants that will enhance and extend our current strengths in the modern applications of mathematics (which includes Control Theory).

More information on this position and on how to apply can be found at:
https://www.bath.ac.uk/jobs/Vacancy.aspx?ref=CC7829

The closing date for applications is Sunday 01 November 2020.

### 6.30. Faculty: University of Washington, USA
Contributed by: Mehran Mesbahi, mesbahi@uw.edu

Assistant Professor - Aeronautics & Astronautics (Controls)

The William E. Boeing Department of Aeronautics & Astronautics at the University of Washington invites applications for a full-time tenure-track faculty position with a nine-month service period. Our faculty members embrace a culture of excellence and inclusion, are committed to graduate and undergraduate education, and develop innovative research programs. Particular research areas of interest include, but are not limited to, guidance, navigation and control, formal methods for aerospace systems, verification/validation, autonomy and control, learning and perception, data-guided methods, aerospace robotics, atmospheric flight, and space systems. Candidates will be expected to complement existing research areas in the department and across campus.

The Department is committed to excellence in research and teaching, with the expectation that all University of Washington faculty engage in teaching, research, and service. The successful candidate is expected to develop a vigorous and innovative externally-funded research program, to provide high-quality teaching that integrates research with instruction at both the undergraduate and graduate levels, and to participate in service activities.

For information about the department, please visit http://www.aa.washington.edu; to apply for this position see https://apply.interfolio.com/78927

### 6.31. Faculty: Lulea University of Technology, Sweden
Contributed by: George Nikolakopoulos, geonik@ltu.se

Assistant Professor - Tenure Track

Luleå University of Technology is experiencing strong growth with world leading competence in several areas of research. Our research is conducted in close collaboration with industries such as Bosch, Ericsson, Scania, LKAB, SKF and leading international universities. Luleå University of Technology has a total turnover of SEK 1.8 billion per year. We currently have 1,700 employees and 15,100 students. We shape the future through innovative education and groundbreaking research. Drawing on our location in the Arctic

region, we create global societal benefit.

The Robotics and Artificial Intelligence (RAI) Subject at the department of Computer Science and Electrical and Space Engineering at Luleå University of Technology, is now looking for one Associate Senior Lecturer in a Tenure Track position contributing to our growing activities. The RAI team is conducting fundamental research in all the aspects of robotics with a specific focus on aerial, space and bioinspired robotics. The vision of RAI is aiming in closing the gap from theory to real life while the team has a strong expertise in field robotics, while it is one of the biggest Academic node of Robotics in Sweden. Specific application areas of focus are robotics for mines, aerial inspection of aging infrastructure, multi-robotic search and rescue, musty sensorial fusion and multirobot coordination, including multirobot perception, decentralization and mission execution. The RAI team has a strong European participation in multiple R&D&I projects, while RAI is also participating in the DARPA SUB-T challenge with the CoSTAR Team lead by NASA/JPL and has an R&D research agenda with HONDA Research Institute in Japan.

Subject description: Robotics and artificial intelligence aim to develop novel robotic systems that are characterised by advanced autonomy for improving the ability of robots to interact with the surrounding environment and humans during the execution of specific tasks.

Research Topic: The Senior Lecturer will be enrolled in a Tenure Track position in RAI. As an Associate Senior Lecturer, you participate in the development of teaching and research in the field of RAI and More specifically the research topics for the announced position are focusing in the areas of autonomous aerial robotics with an emphasis in:
• Vision-based control and visual servoing
• Perception aware navigation and SLAM for robotics
• 3D mapping
• Vision-assisted floating base manipulation
• Advanced sensing
• Object recognition, tracking, semantic and 3D vision techniques
• Image enhancement
• Field Robotics

The position includes responsibilities for:
- Administrate and teach in courses delivered by the Robotics and AI Subject at the first and second cycle level.
- Supervise Master and PhD students
- Grant Applications for initiating new project-based research directions in the RAI subject

The applicant is expected to participate in the group's joint development of the field of education and research, as well as collaborate in research groups both within the department, the university and with other universities, colleges and other external parties both nationally and worldwide. Persons are qualified for appointments as Associate Senior Lecturer: If they have been awarded a Degree of Doctor, or have a foreign degree deemed to be equivalent to a Degree of Doctor.

Persons who have been awarded a Degree of Doctor no more than five years before the last date for applications, should firstly be considered for an appointment. The persons who have been awarded a Degree

of Doctor or have achieved equivalent skills earlier may also be considered, if there are special reasons. Special reasons include leave of absence due to illness, parental leave and similar circumstances.

Assessment criteria
The following criteria are used for the position:
*Scientific skill
*Other criteria, weighted equally:
• Scientific Excellence in the specific research topics of the announced position
• Scientific Excellence in the general field of RAI
• Experience of leading research projects nationally, within the EU or similar ability
• Experience of teaching and educational education
• Documented experience of seeking funding
• Ability to interact and cooperate

Promotion to Senior Lecturer: An associate senior lecturer shall, upon application, be promoted to a senior lecturer and an employment when he / she has the right to an appointment as a senior lecturer when the examination is deemed appropriate for such an appointment according to the assessment reasons given below.

When examining, the associate senior lecturer must have completed university pedagogy education equivalent to 7.5 ECTS credits or alternatively acquired equivalent knowledge. During the period of employment, the assistant lecturer must also, independently, in a considerable extent and with high quality, have contributed to the university's research and demonstrated good pedagogical skills.

Other criteria for Senior Lecturer (weighted equally)
• Successful demonstration of granted research funding
• Scientific excellence and performance
• Teaching involvement and student evaluations

Information: Associate Senior Lecturer position is a full time position for 4 years. For further information please contact Chaired Professor George Nikolakopoulos +46 920 491298, geonik@ltu.se

Application: Please apply for the position by clicking on the application button below and attach the requested application documents including diplomas (certified and translated into Swedish or English), and publications, etc. We prefer that applicants follows the Instructions for applicants. Please write your application in English. We often have English speaking external experts. Mark your application with the reference number.

Final day to apply: 30 november, 2020
Reference number: 3272-2020
URL to this page https://www.ltu.se/ltu/Lediga-jobb?l=en&rmpage=job&rmjob=4059&rmlang=UK

### 6.32. Faculty (Updated): Eindhoven University of Technology, The Netherlands
Contributed by: Maurice Heemels, w.p.m.h.heemels@tue.nl

Title: Seven Assistant/Associate/Full Professor Positions at Eindhoven University of Technology, The Netherlands

The Department of Mechanical Engineering (ME) of the Eindhoven University of Technology (TU/e) is strengthening its world-leading position in the broad area of control, dynamics, optimisation, and artificial intelligence. This strategy is aligned with the founding and expansion of new institutes such as the Eindhoven Artificial Intelligence Systems Institute, www.tue.nl/ai, and the growth and impact of our systems and control research in the Brainport region of the Netherlands (https://brainporteindhoven.com/int/), being Europe's leading innovative top technology region. To realize this ambition, we are opening seven (7) professor positions on all levels in the broad area of dynamics, control, optimisation, and artificial intelligence.

* At the Control Systems Technology (CST) Section
(https://www.tue.nl/en/research/research-groups/control-systems-technology/)

- Associate/Full Professor Systems and Control Technology
(https://jobs.tue.nl/en/vacancy/associate-full-professor-systems-and-control-technology-857695.html)

- Assistant Professor in Control and Optimisation for Intelligent Systems
(https://jobs.tue.nl/en/vacancy/assistant-professor-in-control-and-optimisation-for-intelligent-systems-862597.html)

- Assistant Professor in Modelling and Control of Multi-Physics Systems
(https://jobs.tue.nl/en/vacancy/assistant-professor-in-modelling-and-control-of-multiphysics-systems-857698.html)

- Assistant/Associate/Full Professor Mechanical Design Principles for High-Tech Systems
(https://jobs.tue.nl/en/vacancy/asst-assoc-full-professor-mechanical-design-principles-for-hightech-systems-857696.html)

* At the Dynamics and Control Section
(https://www.tue.nl/en/research/research-groups/dynamics-and-control/)

- Associate/Full Professor Dynamical Systems and Control
(https://jobs.tue.nl/en/vacancy/associate-full-professor-dynamical-systems-and-control-857710.html)

- Assistant Professor Multi-Physics Dynamical Systems Design
(https://jobs.tue.nl/en/vacancy/assistant-professor-1-fte-multiphysics-dynamical-system-design-834195.html)

- Assistant Professor Acoustics of complex engineering systems
(https://jobs.tue.nl/en/vacancy/assistant-professor-acoustics-of-complex-engineering-systems-863035.html)

For all these positions we are seeking excellent candidates to strengthen and expand our department. More details on these positions and the application procedure can be found in the respective links.

### 6.33. Research Fellow: University of Melbourne, Australia
Contributed by: Trewin Nottle-Payne, trewin.nottlepayne@unimelb.edu.au

Opportunity Available - Research Fellow in Networked Control Engineering

The Melbourne School of Engineering is seeking to appoint an emerging academic with a background in Control Engineering to join an ARC funded research project.

The role will focus on the analysis and design of networked control systems, whereby the plant and controller exchange information over a communication network. The aim of this is to best use the structure of the network, plant and controller to achieve robust stability, estimation and tracking. Examples from intelligent traffic applications will be used to test the obtained control/estimation algorithms.

You will be: A passionate researcher with demonstrated experience in your field as evidenced by your publication record, with a motivation to conduct research of the highest quality. You will display a high level of initiative and organisational skills that will enable to carry out research in line with project goals and timeframes. Your excellent interpersonal skills will help you build strong relationships with a diverse range of collaborators and communicate research outcomes effectively as required.

You will have:
- A PhD in Control Engineering or a closely related discipline;
- Proven ability in analysing data and problem-solving with the capability to produce innovative research;
- The ability to engage with both technical and non-technical audiences;
- Demonstrated experience conducting research on networked control systems, along with the completion of ethics and grants applications will be highly regarded.

For further information on this opportunity and to apply please follow this link:
http://jobs.unimelb.edu.au/caw/en/job/903273/research-fellow-in-network-control-systems