

## **E-LETTER on Systems, Control, and Signal Processing**

**Issue 344**

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Welcome to the 344 issue of the Eletter, available electronically [here](#).

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- 5.17 PostDoc: University of Leicester, UK
- 5.18 Research Fellow: University of Hull, UK
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- 5.20 Faculty: IMT School for Advanced Studies Lucca, Italy
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## 1. IEEE CSS Headlines

### 1.1. IEEE Control Systems Society Call for Nominations for 2017 Awards

Contributed by: Joao Hespanha, [hspanha@ece.ucsb.edu](mailto:hspanha@ece.ucsb.edu)

IEEE Control Systems Society Call for Nominations for 2017 Awards

Nominations will open April 15 and are due by May 15, for the following IEEE Control Systems Society Awards (see <http://www.ieeecss.org/awards> for full details).

- George S. Axelby Outstanding Paper Award (for a paper published in 2015 or 2016 in the IEEE Transactions on Automatic Control);
- IEEE Transactions on Control System Technology Outstanding Paper Award (for a paper published in 2015 or 2016 in the IEEE Transactions on Control System Technology);
- IEEE Control Systems Magazine Outstanding Paper Award (for an article published in 2015 or 2016 in the IEEE Control Systems Magazine);
- IEEE Transactions on Control of Network Systems Outstanding Paper Award (for a paper published in 2015 or 2016 in the IEEE Transactions on Control of Network Systems)
- IEEE Control Systems Technology Award (for outstanding individual or team contributions to control systems technology);
- Control Systems Society Transition to Practice Award (for a distinguished contributor to the transition of control and systems theory to practice);
- Antonio Ruberti Outstanding Young Researcher Prize (for a young researcher for innovation and impact on systems and control).
- IEEE Control Systems Society Award for Excellence in Aerospace Control (for a team or individual contribution to Aerospace Control in the previous 36 months)

The IEEE Control Systems Society strongly encourages its members to speak up and reach out to colleagues to initiate award nominations. Each year, many highly qualified individuals, teams, and papers are overlooked for nominations simply because colleagues assumed that a nomination was already being prepared by someone else on the individual's, team's or authors' behalf. You may be surprised to find out that your colleagues would be very pleased to nominate you, if they had just been encouraged to do so.

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### 1.2. CFP: IEEE Control Systems Society Outreach Fund

Contributed by: Daniel E. Rivera, [daniel.rivera@asu.edu](mailto:daniel.rivera@asu.edu)

The IEEE CSS Outreach Task Force is providing notice that the window for submission of proposals to the IEEE-CSS Outreach Fund for its 2017 spring solicitation will be held from April 3 to 28, 2017. Please note that this time window is earlier than usual. Information regarding the program can be found in:

<http://www.ieeecss.org/general/control-systems-society-outreach-fund>

Requests for application forms (as well as inquiries and notices of intention to submit) should be made directly to Daniel E. Rivera, Outreach Task Force Chair, at [daniel.rivera@asu.edu](mailto:daniel.rivera@asu.edu).

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### 1.3. IEEE Control Systems Society Technically Cosponsored Conferences

Contributed by: Luca Zaccarian, CSS AE Conferences, [zaccarian@laas.fr](mailto:zaccarian@laas.fr)

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

- XXVI International Conference on Information, Communication and Automation Technologies (ICAT 2017). Sarajevo, Bosnia and Herzegovina. Oct 26 - Oct 28, 2017. <http://icat.etf.unsa.ba/>
- 21st International Conference on System Theory, Control and Computing (ICSTCC 2017). Sinaia, Romania. Oct 19 - 21, 2017. <http://www.icstcc2017.ac.tuiasi.ro/>
- 6th International Conference on Systems and Control (ICSC 2017). Batna, Algeria. May 7 - May 9, 2017. <http://lias.labo.univ-poitiers.fr/icsc/icsc2017/>
- 2017 International Conference on Unmanned Aircraft Systems (ICUAS'17). Miami (FL), United States. Jun 13 - Jun 16, 2017. <http://www.uasconferences.com/>

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

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### 1.4. IEEE Control Systems Society Publications Content Digest

Contributed by: Elizabeth Kovacs, [ekovacs2@nd.edu](mailto:ekovacs2@nd.edu)

CSS Publications Content Digest 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.

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### 1.5. IEEE Transactions on Automatic Control

Contributed by: Elizabeth Kovacs, [ekovacs2@nd.edu](mailto:ekovacs2@nd.edu)

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## 1.7. IEEE Transactions on Control of Network Systems

Contributed by: Denise Joseph, [dejoseph@bu.edu](mailto:dejoseph@bu.edu)

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## 2. PhD & Summer Schools

### 2.1. 7th oCPS PhD School on Cyber-Physical Systems

Contributed by: Maurice Heemels, [m.heemels@tue.nl](mailto:m.heemels@tue.nl)

The 7th oCPS PhD School on Cyber-Physical Systems

We would like to attract your attention to the "7th oCPS PhD School on Cyber-Physical Systems," which will take place Monday June 12 to Thursday June 15, 2017 in Lucca, Italy. The school is targeted at graduate students and researchers who want to learn the main concepts of cyber-physical systems (CPSs), as well as at graduate students and postgraduate researchers already working in the area. The school is an event organized by oCPS, which is a Training Network (Marie Curie) receiving funding from the European Union's 2020 framework programme for research and innovation, see more on [ocps.ele.tue.nl](http://ocps.ele.tue.nl).

The lecturers are

Prof. Alf Isaksson, ABB Corporate Research

Prof. Christos Cassandras, Boston University, USA

Prof. Joost-Pieter Katoen, RWTH Aachen University, Germany

Prof. Samarjit Chakraborty, TU Munich, Germany

Prof. Maurice Heemels, Eindhoven University of Technology, NL

Prof. Henrik Sandberg, KTH Stockholm, Sweden

Prof. Gerhard Neumann, University of Lincoln, UK

Prof. Alberto Bemporad, IMT Lucca, Italy

Prof. Dimitri Bertsekas, Massachusetts Institute of Technology, USA

Prof. Magnus Egerstedt, Georgia Tech, USA

Prof. Marios Polycarpou, University of Cyprus, Cyprus

These speakers will lecture during the school covering the basic concepts and results on

- Discrete-event and hybrid systems techniques for CPS
- Machine learning
- Resource-aware control
- Formal methods for embedded control
- Security in control of CPS
- Model predictive control
- Approximate dynamic programming and optimisation
- Fault-tolerant control of distributed CPS
- Multi-agent systems
- Industrial perspectives on CPS.

The program of the school includes four days of lectures, interleaved by enough time slots to allow scientific discussions among the participants and with the speakers.

Registration deadline: April 15, 2017. First-come-first-serve basis. Registration fee: EUR 290 (including coffee breaks, banquet, etc)

The oCPS PhD school on Cyber-Physical Systems is also the 8th edition of a series of biannual PhD schools with a focus on hybrid, networked and cyber-physical systems, which educated over 500 PhD students (!) worldwide since 2003, see <http://ocps17.imtlucca.it> for earlier editions!!

The full program of the school, other information and the registration procedure can be found soon at <http://ocps17.imtlucca.it/>

We welcome you, your students and colleagues to this interesting and inspiring event!

Maurice Heemels  
Alberto Bemporad  
Samarjit Chakraborty

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## **2.2. Summer School on “Approximation of Large-Scale Dynamic Models”**

Contributed by: Antoneta Iuliana BRATCU, [antoneta.bratcu@gipsa-lab.fr](mailto:antoneta.bratcu@gipsa-lab.fr)

Summer School on “APPROXIMATION OF LARGE-SCALE DYNAMIC MODELS”

Location and Date: Grenoble (France) - September 11 to 15, 2017

Scientific Chair: Charles POUSSOT-VASSAL (ONERA, Toulouse)

Website: <http://www.gipsa-lab.fr/summerschool/auto2017/>

This Summer School aims at presenting the main mathematical tools and model approximation algorithms, in order to bridge the gap between complexity and representativeness required in control design, analysis, simulation and optimisation. To this end, domain experts will be present to share their expertise and cutting-edge research results.

The Summer School is mainly intended to PhD students, researchers and scholars interested in applying approximation of large-scale dynamic models, being meanwhile open to industrial participants. Basic knowledge in automatic control and mathematics will be useful.

Speakers:

Thanos ANTOULAS (Rice University, Houston, Texas, USA)  
Sara GRUNDEL (Max Planck Institute, Magdeburg, Germany)  
Serkan GUGERCIN (Virginia Tech, Blacksburg, USA)  
Christian HIMPE (Münster University, Münster, Germany)  
Martine OLIVI (INRIA Sophia Antipolis, France)  
Charles POUSSOT-VASSAL (ONERA, Toulouse, France)  
Pierre VUILLEMIN (ONERA, Toulouse, France)

Early registrations are encouraged (registration link will become available by April 20 2017).

The number of participants is limited to 50.

Registration dead-line is July 13th 2017.

For further information, please contact:

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## **2.3. DISC Summer School “A Systems and Control Perspective on Privacy, Safety, and Security in Large-Scale Cyber-Physical Systems”**

Contributed by: Martha, [m.w.otte@tudelft.nl](mailto:m.w.otte@tudelft.nl)

From July 3-6, 2017 the DISC Summer School “A Systems and Control Perspective on Privacy, Safety, and Security in Large-Scale Cyber-Physical Systems” will take place at NH Atlantic, the Hague (Kijkduin), The Netherlands.

The increasing adoption of cyber-physical systems (CPS) and internet-of-things (IoT) introduces new control problems beyond the traditional tasks of stabilization and optimization. Some of the control challenges are related to the operation of future, highly interconnected CPS in a safety- or mission-critical environment, and to the protection of security and privacy where sensor and actuator data, and other control parameters are communicated in a networked CPS. Recent denial-of-service attacks to critical infrastructure and several accidents involving autonomous cars are some of the instances where new theoretical developments in the systems and control field are needed.

In this summer school program, we will present recent developments towards this endeavor and particular attention will be given to:

- differential privacy concept in a control and networked systems context
- analysis and design of resilient and secure control systems
- safety control of CPS

Keynote lectures will be given by:

- Fabio Pasqualetti, University of California, USA
- Jerome Le Ny, Polytechnique Montreal, Canada
- Rafael Wisniewski, Aalborg University, Denmark
- Yiannis Papadopoulos, University of Hull, United Kingdom
- Henrik Sandberg, KTH Royal Institute of Technology, Sweden
- Manuel Mazo, Delft University of Technology, NL
- Peyman Mohajerin Esfahani, Delft University of Technology, NL
- Claudio de Persis, University of Groningen, NL

For more information about the program and registration please visit <http://disc.tudelft.nl/education/summer-school/summer-school-2017/>

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### 3. Journals

#### 3.1. Contents: Automatica

Contributed by: Elisa Capello, [elisa.capello@polito.it](mailto:elisa.capello@polito.it)

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### 3.2. Contents: IEEE/CAA Journal of Automatica Sinica

Contributed by: Yan Ou, [yan.ou@ia.ac.cn](mailto:yan.ou@ia.ac.cn)

IEEE/CAA Journal of Automatica Sinica Volume 4 (2017), Issue 1 (January)

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### 3.3. Contents: System & Control Letters

Contributed by: John Coca, [j.coca@elsevier.com](mailto:j.coca@elsevier.com)

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### **3.4. Contents: European Journal of Control**

Contributed by: John Coca, [j.coca@elsevier.com](mailto:j.coca@elsevier.com)

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Contributed by: John Coca, [j.coca@elsevier.com](mailto:j.coca@elsevier.com)

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### 3.6. Contents: Mathematics of Control, Signals, and Systems

Contributed by: Lars Gruene, [lars.gruene@uni-bayreuth.de](mailto:lars.gruene@uni-bayreuth.de)

Mathematics of Control, Signals, and Systems (MCSS)

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<http://link.springer.com/journal/498/29/1>

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### 3.7. Contents: Asian Journal of Control

Contributed by: Lichen Fu, [lichen@ntu.edu.tw](mailto:lichen@ntu.edu.tw)

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### 3.8. Contents: IMA Journal of Mathematical Control and Information

Contributed by: Kathryn Roberts, [kathryn.roberts@oup.com](mailto:kathryn.roberts@oup.com)

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A new issue of IMA Journal of Mathematical Control and Information is now available online.

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- K. Sivaranjani; R. Rakkiyappan; S. Lakshmanan; C. P. Lim, Robust stochastic sampled-data control for offshore steel jacket platforms with non-linear perturbations, <http://bit.ly/2ndfN1o>

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### 3.9. Contents: Control Engineering Practice

Contributed by: Martin Böck, [cep@acin.tuwien.ac.at](mailto:cep@acin.tuwien.ac.at)

Control Engineering Practice

Volume 61

April 2017

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### 3.10. Contents: International Journal of Control

Contributed by: Bing Chu, [b.chu@soton.ac.uk](mailto:b.chu@soton.ac.uk)

International Journal of Control

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### **3.11. Contents: TWMS Journal of Pure and Applied Mathematics**

Contributed by: Gamar Mammadova, [f.aliev@hotmail.com](mailto:f.aliev@hotmail.com)

TWMS Journal of Pure and Applied Mathematics, Vol. 8, No.1, 2017

ISSN 2076-2585

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### **3.12. CFP: IEEE Internet of Things Journal**

Contributed by: Alex Leong, [alex.leong@upb.de](mailto:alex.leong@upb.de)

CFP: IEEE Internet of Things Journal

Special Issue on Feedback Control for the Internet of Things

The Internet of Things (IoT) is a networked system that allows physical objects to be sensed and controlled with or without frequent human intervention. It thereby creates opportunities for a more direct integration between the physical world and cyber-systems. This brings potential gains in efficiency, accuracy and economic benefits. From an applications perspective, IoT solutions are being conceived of and implemented across the spectrum: smart homes, buildings, environments and cities, industrial plants, health care, smart grids and modern transportation systems.

Whilst in this first wave of IoT, most attention has concentrated on wireless sensors, cloud connectivity, big data analytics and mobile apps, the vision of IoT extends to closed loop operation: Sensors connect through algorithms to actuators, communication is over the Internet. Careful design of such control systems would enable a whole range of novel functionalities, including the capacity to coordinate systems that are not physically connected or collocated in real-time. However, control design for IoT imposes significant

challenges, some of which can be tackled using, and further developing, contemporary feedback control methods. The papers in this special issue will present state-of-the-art fundamental and applied research on feedback control for the IoT. We solicit papers that cover a wide range of topics of interest that include, but are not limited to, the following:

- control architectures for IoT
- control over nondeterministic networks
- cloud-supported control of dynamical systems
- control in the presence of latency and jitter
- control with resource constraints
- predictive maintenance of dynamical systems
- formal methods for verification of IoT control systems
- IoT control applications

Important Dates

Submissions Deadline: July 15, 2017

First Reviews: October 15, 2017

Second Reviews / Notification: December 15, 2017

Final Manuscript Due: December 31, 2017

Publication Date: 2018

Guest Editors

Daniel Quevedo, Paderborn University, Germany

Rolf Findeisen, Otto-von-Guericke University Magdeburg, Germany

Hideaki Ishii, Tokyo Institute of Technology, Japan

Karl H. Johansson, KTH Stockholm, Sweden

Tariq Samad, University of Minnesota, USA

Further details can be found at:

[http://iot-journal.weebly.com/uploads/1/8/8/0/18809834/ieee\\_iot\\_journal\\_si\\_feedback\\_control\\_cfp.pdf](http://iot-journal.weebly.com/uploads/1/8/8/0/18809834/ieee_iot_journal_si_feedback_control_cfp.pdf)

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### **3.13. CFP: IEEE Transactions on Control Systems Technology**

Contributed by: Guillaume Mercère, [guillaume.mercere@univ-poitiers.fr](mailto:guillaume.mercere@univ-poitiers.fr)

CFP: Special Issue on System identification and control in biomedical applications in IEEE Transactions on Control Systems Technology

Contributions are invited for a special issue of the IEEE Transactions on Control Systems Technology devoted to the subject of System Identification and Control in Biomedical Applications. The purpose of this special issue is to document the current status of research in this field through an original collection of diverse, high-quality papers. The emphasis is on the role control systems technology plays in advancing the state of the art in the challenges of applying feedback control in living organisms, with emphasis on biomedicine. Specifically, we aim at (i) pointing out theoretical and practical issues specific to bio-medical systems, (ii) bringing together solutions developed under different settings with specific attention to the validation of these tools in bio-medical settings using real-life datasets and experiments, and (iii) introducing significant case studies. Topics of common interests include (but are not limited to) the following:

- theoretical and implementation challenges which arise in medical systems,
- control engineering tools for solving specific system design problems in medical technology,
- novel data-driven modeling techniques capturing the dynamics of biomedical systems, and accounting for

intra- and inter-individual variability,

- evidence of successful projects in biomedicine enabled by system identification and control, such as the artificial pancreas and closed-loop anesthesia.
- application areas in healthcare and medical systems, such as assistive devices and therapeutics in medical rehabilitation, and mathematical models of infectious disease spread.
- prevention and treatment of chronic, relapsing disorders and illnesses such as cancer, diabetes, obesity, and HIV.

Only contributions that include significant results based on analysis of real data or experimental validation will be included. Papers must contain high-quality original contributions and be prepared in accordance with the IEEE Transactions on Control Systems Technology standards. Prospective authors should state in their cover letter and in the notes section of the submission site that their manuscript is intended for the special issue on “system identification and control in biomedical applications.” Submitted manuscripts must not have been previously published or be under review for possible publication elsewhere.

Time line:

Manuscripts Due: November 1, 2017

Notification to authors (after the first round of reviews): March 1, 2018

Notification of final decision: June 1, 2018

Publication Date: January 2019

Authors can submit their manuscripts via <https://mc.manuscriptcentral.com/tcst>

Information for Authors prior to submitting a paper is available via <http://www.ieeecss.org/publications/tcst/information-authors>

All inquiries should be directed to G. Mercère you can contact via his email address: [guillaume.mercere@univ-poitiers.fr](mailto:guillaume.mercere@univ-poitiers.fr)

Guest Editors:

Guillaume Mercere, Universitede Poitiers, France (LEAD)

Bayu Jayawardhana, University of Groningen, The Netherlands

Alexander Medvedev, Uppsala University, Sweden

Daniel E. Rivera, Arizona State University, Tempe, Arizona, USA

Caterina Scoglio, Kansas State University, Manhattan, Kansas, USA

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## 4. Conferences

### 4.1. Workshop on Brain Dynamics and Neurocontrol Engineering

Contributed by: ShiNung Ching, [shinung@wustl.edu](mailto:shinung@wustl.edu)

2017 Workshop on Brain Dynamics and Neurocontrol Engineering, June 26-27, 2017

We are pleased to invite participants to the 2017 Workshop on Brain Dynamics and Neurocontrol Engineering at Washington University in St. Louis (St. Louis, MO, USA), to be held this summer (June 26-27).

\*\* Travel awards are available for students, postdocs and junior faculty. \*\*

Spurred by the development of both new technologies and new scientific initiatives, interest is coalescing around the use of dynamical systems and control theory to study the workings of the human brain. Neuroscience affords several research challenges and opportunities for the dynamics and control community, due to the immense complexity of the system at hand, the dynamics of which span many spatial and temporal

scales. Understanding how these dynamics mediate brain function is a pivotal neuroscience question that is well-aligned with methodological approaches innate to systems and control engineering. The goal of this workshop is to provide a focused forum for the discussion of research synergy between experts from the dynamics, control and neuroscience communities.

For full information, including speaker list, award and registration details, please visit:

<http://sites.wustl.edu/brain>

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#### **4.2. Japan-Korea Joint Symposium on Networked and Distributed Systems and Control**

Contributed by: Hyo-Sung Ahn, [hyosung@gist.ac.kr](mailto:hyosung@gist.ac.kr)

The 1st Japan-Korea Joint Symposium on Networked and Distributed Systems and Control - Toward future research collaborations, June 16-17, 2017, GIST, Gwangju, Korea

Call for participation: As control, communications, sensing, and computational technologies are advanced, networked and distributed systems become more realistic in our daily life as well as in industry. The networked and distributed control systems may include a remote control of tele-operated systems, synchronization and consensus of large-scale complex systems, cyber-physical systems, distributed coordination of energy and power systems, and formation control of mobile agent systems. As the computational speed of embedded processors connected via networks becomes extremely fast, a higher-level control in these systems becomes more and more important. In the sense of higher-level control, analysis and control from topological perspective of networked and distributed systems have attracted significant research interest. In analysis, there are many issues such as synchronization of dynamical agents, convergence characteristics, graph topology, and connectivity between neighboring agents. In control, there could be various issues in terms of sensing and control variables, i.e., centralized control, distributed control, and decentralized control. In this joint symposium, we are specifically interested in networked robots, synchronization of distributed and social agents, energy and resource allocations, and formation control of multi-agent systems. The main purpose of the symposium is to introduce recent advancements on these issues that have been developed in Japan and Korea. However, in the symposium, we would further seek some possible collaborations among the participants by way of discussing issues and sharing ideas. If you are interested in attending this symposium as audience or as speaker, please send your "intention for participation" to one of the following contacts:

[hyosung@gist.ac.kr](mailto:hyosung@gist.ac.kr) (Prof. Hyo-Sung Ahn, GIST) from Korea, or  
[hatanaka@ctrl.titech.ac.jp](mailto:hatanaka@ctrl.titech.ac.jp) (Prof. Takeshi Hatanaka, Tokyo Tech) from Japan

by May 30, 2017.

Outline of tentative program: The symposium will consist of keynote technical talks and problem definition sessions. Two technical sessions will include four keynote talks. In the problem definition session, individual speaker will be allowed to present his/her problems within a five minute in one slide. In the problem definition session, we would like to discuss the problems intensively. Students will be allowed to present their on-going works via 3-minute presentations, if they want. The symposium will also have some social events.

Specially invited speakers:

Kazunori Sakurama, Tottori University, Japan

Hyungbo Shim, Seoul National University, Korea

Takeshi Hatanaka, Tokyo Tech, Japan

Hyo-Sung Ahn, GIST, Korea

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### 4.3. International Conference on Control, Automation and Systems

Contributed by: Hye-Soo Kim, [conference@icross.org](mailto:conference@icross.org)

2017 17th International Conference on Control, Automation and Systems (ICCAS 2017)

October 18(WED)-21(SAT), 2017

Ramada Plaza, Jeju Island, Korea

<http://2017.iccas.org>

2ND CALL FOR PAPERS: [http://icross.org/data/download/ICCAS2017/ICCAS2017\\_CFP.pdf](http://icross.org/data/download/ICCAS2017/ICCAS2017_CFP.pdf)

The aim of the ICCAS is to bring together researchers and engineers worldwide to present their latest works, and disseminate the state-of-the-art technologies related to control, automation, robotics, and systems.

Paper Submission: Authors are invited to submit regular papers (3 - 6 pages) or research poster papers (1 - 2 pages) to the website.

Indexed in: IEEE Xplore, EI compendex, SCOPUS

#### IMPORTANT DATES

Proposal for Invited/Organized Session (Mini-symposium)

- June 10, 2017: Submission deadline

Regular Papers (3 - 6 pages) & Invited/Organized Session Papers (1 - 6 pages)

- June 15, 2017: Submission deadline

- August 1, 2017: Notification of acceptance

- August 31, 2017: Submission of final camera-ready papers

Research Poster Papers (1 - 2 pages)

- August 22, 2017: Submission deadline

- August 31, 2017: Notification of acceptance

- September 7, 2017: Submission of final camera-ready papers

#### PLENARY SPEAKERS

- Richard D. Braatz (Massachusetts Inst. of Tech., USA)

- Reza Moheimani (Univ. of Texas, USA)

- Antonella Ferrara (Univ. of Pavia, Italy)

- Huijun Gao (Harbin Inst. of Tech., China)

- Atsuo Takanishi (Waseda Univ., Japan)

Organized by Institute of Control, Robotics and Systems (ICROS)

General Chair: Dong-il “Dan” Cho (Seoul Nat’l Univ., Korea / ICROS President)

Organizing Chair: Doyoung Jeon (Sogang Univ., Korea)

Program Chair: Hyosung Ahn (GIST, Korea)

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### 4.4. ACC Workshop on “Control Engineering in Julia: Modelling, Control Design and Optimization”

Contributed by: Cristian R. Rojas, [cristian.rojas@ee.kth.se](mailto:cristian.rojas@ee.kth.se)

2017 ACC Workshop on Control Engineering in Julia: Modelling, Control Design and Optimization

Tuesday, May 23, 2017, 8:30am - 12:30pm

Seattle, WA, USA, at the 2017 American Control Conference

Julia is a recent high-level, high-performance, free and open-source programming language for technical computing. It has a syntax similar to other technical computing environments and possesses a number of

very attractive features for the control and optimization communities: its sophisticated compiler results in run-times comparable to C, it has native support for distributed parallel execution, it includes an extensive mathematical function library, and can be executed stand-alone, in a powerful browser-based graphical notebook interface (JJulia) or in a network-based environment which does not require any local installation (JuliaBox). In addition, the Julia developer community is contributing a number of external packages through Julia's built-in package manager at a rapid pace.

Over the last years, several Julia packages have been developed to complement the work of control engineers. These include several toolboxes for convex and nonconvex optimization, automatic differentiation, simulation of ordinary differential equations and noncausal models, statistics, machine learning, data-driven modeling and control.

This workshop is being organized for the purpose of disseminating and promoting the Julia language and several of its control and optimization-related packages to those who work in control theory, education and applications. Many of the talks will be hands-on, in order to provide the audience with a real, interactive Julia experience. Participants from industry and teachers may find Julia to be a powerful and solid alternative to commercial software. Those who do research in control and identification theory will acknowledge that the open platforms developed for these disciplines can provide a attractive means of developing and promoting their own research, by contributing to these packages with their new algorithms.

For more information, including registration details, please visit: <http://people.kth.se/~crro/workshop.html>  
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#### **4.5. IFAC World Congress Workshop on “Iterative Learning Control and Repetitive Control: Theoretical Advances and Emerging Applications”**

Contributed by: Bing Chu, [b.chu@soton.ac.uk](mailto:b.chu@soton.ac.uk)

2017 IFAC World Congress Workshop on “Iterative Learning Control and Repetitive Control: Theoretical Advances and Emerging Applications”

Date and Place: Sunday, 9 July 2017, at the IFAC World Congress Venue, Toulouse, France

Website: <https://goo.gl/v82ELH>

Organizers: Bing Chu, Christopher Freeman, Tom Oomen, Kira Barton, Ying Tan

Speakers: Kevin L Moore (Colorado School of Mines, USA); David H Owens (Zhengzhou University, China and University of Sheffield, UK); Tom Oomen (Eindhoven University of Technology, The Netherlands); Ying Tan (University of Melbourne, Australia); Kira Barton (University of Michigan, USA); Bing Chu (University of Southampton, UK); Chris Freeman (University of Southampton, UK); Deqing Huang (Southwest Jiaotong University, China); Mikael Norrlöf (Linköping University, Sweden)

Iterative Learning control (ILC) and repetitive control (RC) are high performance tracking control design methods for systems operating in a periodic or repetitive manner. To achieve this they both adapt the control effort based on information collected from previous trials (periods). Compared to conventional control design approaches, ILC and RC potentially lead to significantly better performance even without accurate system model information. Originating from robotic research, ILC and RC have attracted intensive research effort and have proven to be extremely successful in achieving attractive system performance in a wide range of application domains, including manufacturing processes, mechanical testing equipment, chemical batch processes and next generation health care.

After more than 30 years, ILC and RC have progressed considerably in both theoretical research and its practical application. This workshop, together with an open invited track within the main conference, aims

to provide an overview of the latest advances in ILC and RC and to create a forum for high quality discussion of both theoretical and practical perspectives. In particular, the workshop aims to:

- Bring together results representing the dominant analysis and design paradigms, including internal model design, norm-optimal design, frequency domain design, and design for nonlinear systems
- Address new theoretical challenges in ILC and RC, including robustness and flexibility to varying tasks, networked systems, etc.
- Present new emerging and non-traditional applications
- Discuss future challenges and opportunities in ILC and RC

The workshop also features a poster session providing a great opportunity for the participants to showcase their work both to the ILC/RC community and to the broad audience.

For more information please see <https://goo.gl/v82ELH>

Students can register at a discounted rate (see <http://www.ifac2017.org/registration>).

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#### **4.6. IFAC World Congress Workshop on “Process Data Analytics”**

Contributed by: Sirish L. Shah, [sirish.shah@ualberta.ca](mailto:sirish.shah@ualberta.ca)

2017 IFAC World Congress workshop on:

Process Data Analytics

Speakers: Tongwen Chen, Biao Huang, Sirish L. Shah, Nina Thornhill and Jiandong Wang

For more details and registration visit link at:

<https://www.ifac2017.org/workshops-and-tutorials>

Time: Sunday, 9th July 2017; 9:00-17:30

Workshop outline

Process data analytic methods rely on the notion of sensor fusion whereby data from many sensors and alarm tags are combined with process information, such as physical connectivity of process units, to give a holistic picture of health of an integrated plant. The fusion of information from such disparate sources of data is the key step in devising methodologies for a smart strategy for process data analytics. In the context of the application of analytics in the process industry, the objective in this workshop is to introduce participants to tools, techniques and a framework for seamless integration of information from process and alarm databases complemented with process connectivity information. The discovery of information from such diverse and complex data sources can be subsequently used for process and performance monitoring including alarm rationalization, root cause diagnosis of process faults, hazard and operability (Hazop) analysis, safe and optimal process operation. Such multivariate process data analytics involves information extraction from routine process data, that is typically non-categorical (as in numerical process data from sensors), plus categorical (or non-numerical or qualitative and binary) data from Alarm and Event (A&E) logs combined with process connectivity or topology information that can be inferred from the data through causality analysis or as obtained from piping and instrument diagrams of a process. The latter refers to the capture of material flow streams in process units as well information flow-paths in the process due to control loops.

Target audience: The intended audience for this workshop would be industrial practitioners of control including vendors working in the area of on-line data logging and archiving, graduate students with interests in statistical learning and data science and academics.

Workshop Program

The following topics will be discussed in this workshop. Each topic will be accompanied by one or more

industrial case study to convey the utilitarian value of the learning, discovery and diagnosis from process data.

- Overview of the broad analytics area with emphasis on its use in the process industry.
- Basic definitions and introduction to supervised and unsupervised learning: simple regression, classification and clustering.
- Data visualization methods; examination and analysis of data in a multivariate framework (in the temporal as well as the spectral domains).
- Data quality assessment: Outlier detection; filtering and data segmentation.
- Elements of statistical inference and learning including
- Bayesian methods.
- Multivariate methods for data analysis: SVD, PCA, PLS, SVR.
- Case studies on nearest neighbour methods for multivariate detection and diagnosis of transient disturbances.
- Alarm data analysis: Detection and removal of nuisance alarms; root-cause analysis of alarms and alarm floods.
- Data-based causality analysis for identification of process topology.
- Future areas to explore in the use of statistical learning, data science and analytics for improved process operation.

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## 5. Positions

### 5.1. Technical Writer for IEEE Control Systems Magazine

Contributed by: Jonathan How, [jhow@mit.edu](mailto:jhow@mit.edu)

Technical Writer for IEEE CSM

The IEEE Control Systems Magazine (CSM) seeks to hire a technical writer (TW) to help produce the print and electronic, peer review content that is well written and accessible to a technologically literate, interdisciplinary audience. CSM articles are evaluated on both the technical presentation of the authors' work and its interest to readers - not just its scientific novelty or perceived impact on the field. The TW would help the Editor-in-Chief to provide feedback to the authors to improve the prose of the articles before they are accepted for publication and check the page proofs when returned from IEEE.

The ability to write well and critique other authors/contributors, especially with regard to highly technical and complex proposals, is a necessary skill set for this position. Several years' experience in a technical publishing leadership role is highly desirable. Extensive experience in publication planning, and scheduling, and knowledge of the publications process is critical to keeping the publication current and on schedule. Subject matter knowledge would be beneficial, but is not necessary.

The load is heaviest every 2 month, has tight deadlines, and averages about 40hrs/month. Compensation in the range of \$30 - \$50 per hour that will be commensurate with experience.

If interested, please send a short CV, examples of past work, and references to the CSM EiC ([jhow@mit.edu](mailto:jhow@mit.edu))

Links:

CSM: <http://ieeecss.org/publications/csm>

Authors Guide: [http://ieeecss.org/sites/ieeecss.org/files/CSMAG\\_May2016.pdf](http://ieeecss.org/sites/ieeecss.org/files/CSMAG_May2016.pdf)

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## 5.2. PhD: Université Laval, Canada

Contributed by: André Desbiens, [desbiens@gel.ulaval.ca](mailto:desbiens@gel.ulaval.ca)

PhD: Université Laval, Canada

Three PhD positions are available at the LOOP (Laboratoire d'observation et d'optimisation des procédés – Process Observation and Optimization Laboratory), Université Laval, Québec City, Canada. The projects are in collaboration with the multinational biopharmaceutical Pfizer. They address industrial problems and the solutions will have significant impacts for Pfizer.

For pharmaceutical industries, automation and continuous processing is a way to become more competitive, to reduce production time, energy consumption and the amount of waste produced. Towards this objective, the projects are:

Project #1 - Coating of the tablets: development of an in-line vision sensor providing film-coating properties (coating level, distribution across tablets, esthetical defects, etc.).

- Fractional factorial design
- Multivariate Image Analysis
- Partial Least Squares regression
- Validation of the machine vision sensor

Project #2 – Novel continuous drying of the granules (before they are compressed into tablets): safe and robust in-line minimization of the drying time and/or energy consumption while insuring a desired final humidity of the particles and avoiding their overheating.

- First-principles modelling and model calibration
- State estimation
- Model predictive control
- Real-time optimization

Project #3 - Freeze-drying of vials: safe and robust in-line minimization of the primary drying time and/or energy consumption while insuring that sublimation is completed and avoiding to exceed the collapse temperature.

- First-principles modelling and model calibration
- State estimation
- Model predictive control
- Real-time optimization
- Heating policies for various vials arrangements

The final stage of the three projects is to implement and validate the most promising approaches on pilot units.

Candidate profile:

- should have completed, or about to complete, a MSc degree in Electrical or Chemical Eng., or related areas,
- strong background in multivariate statistics and/or first-principles modelling and/or systems and control,
- solid programming skills in Matlab,
- ability to work in multi-disciplinary teams,
- excellent communication skills (oral and written) in English - a plus if knowledge of French (courses are given in French).

Please send a complete CV, a motivation letter and transcripts to Prof. André Desbiens ([desbiens@gel.ulaval.ca](mailto:desbiens@gel.ulaval.ca)) with the subject “E-Letter PhD position”.

### 5.3. PhD: Université Grenoble Alpes/GIPSA-lab, France

Contributed by: Emmanuel Witrant, [emmanuel.witrant@univ-grenoble-alpes.fr](mailto:emmanuel.witrant@univ-grenoble-alpes.fr)

PhD Position Université Grenoble Alpes / GIPSA-lab (France)

Supervisors: Prof Emmanuel Witrant and Dr. Vincent Talon

Web: <http://www.gipsa-lab.fr/~e.witrant/>

PhD topic: Estimation and Control for Networks of Gas Mixtures with Application to EGR in Car Engines

Starting date: June/July 2017, for a duration of 3 years

Description:

Modeling and control of fluid flow networks has been a challenging topic during the last decades. This research is motivated by engineering applications such as car engines, mine ventilation systems, gas pipelines, water channels, traffic flow dynamics, heat exchangers, etc. Estimation and control of gas mixtures are of prime interest for car engines and more precisely to control the gas composition in the admission air-path while taking into account the exhaust gas recirculation (EGR) inner and outer loop. Engineering models for gas networks are typically based on Kirchhoff's voltage and current laws, combined with the fluid dynamical equations of individual branches.

The aim of this thesis is to propose new estimation and control solutions for these systems and take benefit of the partial differential equations analysis to propose efficient algorithms that can be embedded in electronic control units. The theoretical results will be applied to car engines with EGR, on problems such as the estimation of gas composition, of time delays and of humidity, and such as optimal control design taking into account the transport phenomena.

This PhD is part of the European project EMPHYSIS (within the framework of ITEA3), whose European leader is Bosch and the French leader is Siemens PLM (<https://itea3.org/project/emphysis.html>).

Requirements:

The Ph.D. candidate should hold a Master degree in Automatic Control or Applied Mathematics, and have a keen interest in fluid dynamics.

Contact: [emmanuel.witrant@univ-grenoble-alpes.fr](mailto:emmanuel.witrant@univ-grenoble-alpes.fr), [vincent.talon@renault.com](mailto:vincent.talon@renault.com)

- CV with contact details
- Bachelor and master transcripts (including list of courses with corresponding grades)
- A summary of (or an e-link to) your master thesis
- Name and email of two references

Closing date for applications

01.05.2017

### 5.4. PhD: KU Leuven, Belgium

Contributed by: Jan Swevers, [jan.swevers@kuleuven.be](mailto:jan.swevers@kuleuven.be)

The KU Leuven, Department of Mechanical Engineering is searching for a young, motivated and skilled PhD researcher with a strong background in numerical optimization, systems and control, and robotics.

RESEARCH PROJECT: This project focuses on optimal contact-free motion control of serial robots operating in changing environments. Changing environments require real-time motion planning, which is very

challenging due to complex robot kinematics and dynamics and continuously changing collision constraints. The overall project goal is to develop and experimentally validate an effective MPC approach for serial robots that realizes contact-free optimal robot motion planning and control in real-time. This research will be supported by an MPC toolchain development in order to integrate all software in an open and modular fashion as to create a workflow from problem specification to deployment. All developments will be validated experimentally on industrial robotic set-ups in the lab.

**YOUR PROFILE:** An ideal candidate has a master degree in engineering (mechanical, control ...) and a strong background in control and dynamic system modelling, robotics, numerical optimization, programming (Matlab, C/C++), a strong interest and experience in work on real-world experiments, and enthusiasm for the project. Proficiency in English is a requirement. Applicants whose mother tongue is neither Dutch nor English must present an official language test report. The acceptable tests are TOEFL, IELTS, and Cambridge Certificate in Advanced English (CAE) or Cambridge Certificate of Proficiency in English (CPE). Required minimum scores are:

- TOEFL: 600 (paper-based test), 100 (internet-based test)
- IELTS: 7 (only Academic IELTS test accepted)
- CAE/CPE: grade B or A.

**OUR OFFER:** A fully funded PhD position for four years at the KU Leuven (more information for PhD students at the KU Leuven is found here). KU Leuven is among the top European universities and a hub for interdisciplinary research in the field of optimization. You will be embedded in the MECO research team of the department of Mechanical Engineering located at the campus in Leuven and the new mechatronics research group, established in 2015, and located at the campus in Bruges. Theoretical work and lab experiments, which will be the main part of the work, will be carried out at the campus in Leuven. Industrial applications will be implemented at the campus in Bruges.

**APPLICATION PROCEDURE:** To apply, send email to [jan.swevers@kuleuven.be](mailto:jan.swevers@kuleuven.be). Subject of your email should be: "ROBOT MPC PhD application". Deadline: April 30, 2017! Include:

- an academic CV,
- a Pdf of your diplomas and transcript of course work and grades,
- statement of research interests and career goals (max. 2 pages),
- sample of technical writing (publication or thesis),
- contact details of at least two referees,
- proof of English language proficiency test results.

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## 5.5. PhD: KU Leuven, Belgium

Contributed by: Goele Pipeleers, [goele.pipeleers@kuleuven.be](mailto:goele.pipeleers@kuleuven.be)

One fully funded open PhD position at KU Leuven, Department of Mechanical Engineering  
B-SPLINE BASED MOTION PLANNING AND MODEL PREDICTIVE CONTROL

The KU Leuven, Department of Mechanical Engineering is searching for a young, motivated and skilled PhD researcher with a strong background in numerical optimization, systems theory and control.

**RESEARCH PROJECT:**

In motion planning one seeks for the fastest, most energy efficient... trajectory to move a motion system from its current position to its destination, while accounting for the system's kinematic and dynamic constraints and avoiding collisions with all obstacles in the environment. It plays a vital role in the control of autonomous guided vehicles, CNC machine tools, serial robots... As motion planning is often performed on line, in

a model predictive control fashion, solving the resulting optimization problems efficiently and reliably is of the utmost importance. Recently, we have developed an effective motion planning method based on B-splines. The motion trajectory is parameterized as a polynomial spline and the properties of the B-spline basis functions are exploited to efficiently enforce constraints over the considered time horizon. The method is implemented in the open source Python toolbox OMGtools (<https://github.com/meco-group/omg-tools>). In this research project you will extend this motion planning approach to a broad range of systems, and in collaboration with experts in numerical optimization, you will supply it with tailored optimization routines. In addition, you will contribute to the underlying B-spline based optimization approaches and explore additional uses of these approaches in model predictive control.

#### YOUR PROFILE:

An ideal candidate holds a degree in engineering, computer science, or applied mathematics. He or she has a solid background in numerical optimization, systems theory and control, a strong interest and experience in mathematical programming (Matlab, Python, C/C++), and enthusiasm for scientific research. Team player mentality, independence, and problem solving skills are expected, and proficiency in English is a requirement.

#### OUR OFFER:

A fully funded PhD position for four years at the KU Leuven (more information for PhD students at the KU Leuven is found at <https://www.kuleuven.be/personeel/jobsite/en/phd-info>). KU Leuven is among the top European universities and a hub for interdisciplinary research in the field of control and optimization. You will be embedded in the MECO research team of the department of Mechanical Engineering (<https://www.mech.kuleuven.be/en/pma/research/meco>). The MECO research team focuses on the identification, analysis and control of mechatronic systems such as machine tools, active suspensions, robots... Herein theoretical developments are combined with experimental validations on lab-scale as well as industrial setups.

#### APPLICATION PROCEDURE:

To apply, send an email to [goele.pipeleers@kuleuven.be](mailto:goele.pipeleers@kuleuven.be) with subject "BSpline PhD application". Include:

- \* an academic CV
- \* a pdf of your diplomas and transcript of course work and grades
- \* statement of research interests and career goals (max. 2 pages)
- \* sample of technical writing (publication or thesis)
- \* contact details of at least two referees
- \* proof of English language proficiency, in case your mother tongue is neither Dutch nor English

Deadline: April 30, 2017

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## 5.6. PhD: University of South Florida, USA

Contributed by: Tansel Yucelen, [yucelen@lacis.team](mailto:yucelen@lacis.team)

The Laboratory for Autonomy, Control, Information, and Systems (LACIS, <http://www.LACIS.team/>) at the University of South Florida is looking for exceptional doctoral students with solid background and creative skills. The LACIS is a highly-active research laboratory on systems and control with past and current projects from a diverse set of funding agencies, where the researchers at the LACIS have the opportunity to collaborate with many researchers around the world. These students to be hired are expected to perform high-quality research on distributed control and robust adaptive systems with applications to swarm of unmanned aerial and ground vehicles. Our intention is to give a strong guidance to maximize the chances of our students for building a rewarding career.

The intended start date for these open positions is Summer or Fall 2017. In addition, basic application requirements for these open positions include: 1) A Master of Science degree in a related field such as electrical engineering, mechanical engineering, aerospace engineering, or mathematics. 2) A strong record of courses taken related to systems and control (including, for example, linear control systems and nonlinear control systems). 3) If the candidates already have published and/or submitted research papers related to systems and control, this will be considered positively during the application process.

If you are interested in joining the LACIS to do transformative research, please send an email to Dr. Tansel Yucelen (yucelen@lakis.team), the Director of the LACIS, and include A) your resume (resume needs to include a list of undergraduate and graduate courses taken related to systems and control as well as mathematics - with grades on these courses, and it should also include list of published and/or submitted papers, if any) and B) a concise paragraph explaining your theoretical and experimental experience related to systems and control. Please also include contact information (name, affiliation, and email) of your current advisor and at least one other reference.

Dr. Tansel Yucelen

Assistant Professor of Mechanical Engineering

Director of the Laboratory for Autonomy, Control, Information, and Systems (LACIS, <http://www.lakis.team>)

Director of the Control Systems Forum (CSF, <http://consys.forum.mst.edu/>)

University of South Florida

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### 5.7. PhD: University of Connecticut

Contributed by: Abhishek Dutta, [abhishek.dutta@uconn.edu](mailto:abhishek.dutta@uconn.edu)

Two PhD positions are available starting in Summer or Fall 2017 in my group which is roughly based on robust design, control and learning in the departments of mechanical and electrical & computer engineering at the University of Connecticut. The research emphasizes theoretical analysis involving the interplay of dynamics, control and optimization under uncertainty and is strongly driven by two broad applications:

- (i) Biology Track: Neuroscience (understanding and solving complex phenomena/disorders)
- (ii) Mechatronics Track: Disaster management (weather related i.e. drought etc. amongst other humanitarian problems).

Both the projects would involve collaborations across disciplines and some product design and prototyping (undergrads may be available to help). Funding for buying equipments will be available.

A masters degree in electrical/mechanical engineering, applied mathematics with strong skills in controls, optimization, learning, mathematics and mechatronics is preferred. Some level of hands-on experience with hardware design is a bonus.

Please send in a 1 page cover letter describing background and research interests and a CV to:

Abhishek Dutta, Assistant Professor

School of Engineering

University of Connecticut

[abhishek.dutta@uconn.edu](mailto:abhishek.dutta@uconn.edu)

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### 5.8. PhD: Johannes Kepler University Linz, Austria

Contributed by: Nadja Aichinger, [nadja.aichinger@jku.at](mailto:nadja.aichinger@jku.at)

PhD: Johannes Kepler University Linz, Insititue for Design and Control of Mechatronical Systems, Autria;  
Supervisor: Prof. Dr. Luigi del Re

Opening for PhD in the Field of Modeling and Control with Focus on Biomedical Applications

The Institute for Design and Control of Mechatronical Systems at the Johannes Kepler University in Linz, Austria, has a long tradition in performing control engineering research with a main focus on automotive and biomedical applications. There exist strong links with academic and industrial partners active in both areas. Besides other projects, the institute is currently involved in the development of control algorithms for adaptive, predictive replacement therapy for diabetes patients with type 2 diabetes. Furthermore, the institute is active in designing advanced algorithms for the data processing in continuous glucose monitoring (CGM) systems.

In this framework, a PhD position is available, initially for one year, which in the case of successful cooperation can be extended up to the end of the PhD study (typically 3 to 4 years).

The tasks associated to this position will include help in data analysis, integration of physiological understanding with modern modeling approaches, algorithmic development, participation in testing and evaluation, in the administration of projects, in teaching and in the direction of Bachelor and Master students in this field. The candidate should have a degree with a focus on automatic control or biomedical engineering, mathematics or computer sciences and be interested in the field of medical systems and stochastic models. Team player qualities are essential.

The salary will be between euro 2.048,25/month gross (75%) and 2.731,00/month gross (100%) both 14 times a year.

The position can be filled anytime from 04/2017 to 10/2017.

For more information contact please Prof. Luigi del Re (luigi.delre@jku.at). Applications to be sent to: nadja.aichinger@jku.at.

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### **5.9. PhD: Luleå University of Technology, Sweden**

Contributed by: George Nikolakopoulos, [geonik@ltu.se](mailto:geonik@ltu.se)

Two PhD- Student positions in Robotics

[Ref: 1070-2017]

The Robotic Team of the Control Engineering Group (CEG) at the department of Computer Science and Electrical and Space Engineering at Luleå University of Technology, is now looking for two PhD student positions contributing to our growing activities in the area of aerial and ground robotics. The PhD students will be part of a strong research team with intense expertise in the area of aerial field robotics and will have the pleasure to work in multiple European and National research projects in Robotics.

The research topics will focus in the following areas:

- Multiple camera view cooperative perception for UAVs
- Collaborative SLAM
- Cooperative Task allocation, scheduling and planning
- Aerial cooperative Visual Servoing
- Augmented Reality for robotics
- Event based constrained remote control
- Safe and robust navigation for aerial and ground robots in featureless or reduced feature environments (e.g. mines)

- Visual Odometry on low light environments
- Environmental perception and online mission configuration for UAVs
- 6D real time Localization for aerial and ground robotic applications in mines
- Ultra Wide Band Localization
- Field Robotics demonstration of the corresponding research topics outcomes

Duties:

The ideal candidate 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 MSc students, Teaching Assistant tasks and support in acquire funding for future research projects from research funding agencies/councils, EU framework program or industry. The candidate will need to represent the group in different occasions, both in Sweden and abroad, as well as to have an excellence in speaking English. A doctoral student's main responsibility is to pursue doctoral studies with the aim to successfully defend a doctoral dissertation. The position may include departmental duties (typically teaching) with up to 20% of full-time employment.

Qualifications:

The research tasks require a solid mathematical background with proven advanced experimental capabilities and excellent programming skills (e.g. C++). The candidates should have a strong vision to evaluate and demonstrate the research findings in real life operating conditions, in an approach to close the gap among pure theory and experimental verifications.

Information:

For further information, please contact Professor George Nikolakopoulos +46 920 491298, [geonik@ltu.se](mailto:geonik@ltu.se)

Union representatives: SACO-Daina Dagens Daina.Dagis@ltu.se , +46 (0)920-493880 and OFR- Lars Frisk, [Lars.Frisk@ltu.se](mailto:Lars.Frisk@ltu.se) +46 (0)920-491792

Luleå University of Technology is actively working on equality and diversity that contributes to a creative study- and work environment. The University's core values are based on respect, trust, openness and responsibility.

Application:

The application should include a CV, personal motivation letter, reference letters, and copies of verified and translated diplomas Universities. Your application must be written in English. Mark your application with the reference number below.

Reference number: 1070-2017

Final day to apply:

2017-04-10

URL to this page:

<https://www.ltu.se/ltu/Lediga-jobb?l=en&rmpage=job&rmjob=2181&rmlang=UK>

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## 5.10. PhD: University of Leicester, UK

Contributed by: Matteo Rubagotti, [matteo.rubagotti@le.ac.uk](mailto:matteo.rubagotti@le.ac.uk)

PhD Position University of Leicester (UK)

Supervisors: Dr Matteo Rubagotti and Prof Matthew Turner

Project title: Predictive control of an integrated energy storage facility

A fully funded PhD position is available for UK and EU students (subject to a competitive selection process) at the Computational Engineering and Control Group at the University of Leicester, UK.

Starting date: 25 September 2017.

Deadline for application: 10 April 2017, 12pm (midday).

Project description:

The research activity of this PhD proposal is aimed at designing and testing advanced control methods for the real-time management of an Integrated Energy Storage Test and Verification (IESTV) facility. The facility will include state-of-the-art energy storage devices, and give the opportunity to design and test advanced algorithms that can have an impact on real-life implementations. The combined use of multiple storage systems (e.g., electrochemical batteries, supercapacitors, compressed air energy storage, and pumped hydro storage) can simultaneously exploit all their advantages, but requires the ability to manage their complex interaction in real time. The proposed PhD activity will be aimed at designing a strategy that takes into account the practical characteristics of the IESTV.

The energy flow to/from the IESTV will depend on the power demand, and the power produced by photovoltaic renewable sources. The designed management system will carry out the tasks of (a) deciding in real time how much power to be drawn from the grid, or possibly “selling” electricity to the grid itself in case of excess storage, and (b) how to split the storage between the elements taking operative constraints into account (e.g., limiting the charge/discharge cycles on batteries, or the depth of charge/discharge of the different elements). The management problem will be solved by continuously predicting the consumer demand and the future power flow from renewable energy sources (via weather forecast), and re-planning the optimal strategy in order to minimise the total energy consumption, or the overall expense for buying electricity from the grid. This approach is known as Model Predictive Control (MPC), a control technique that has been applied to many practical problems in industry, and is now, for instance, a standard in petrochemical plants.

Candidate profile:

Required:

- first class (or equivalent) bachelor-level degree in engineering or a relevant subject (to be obtained before 25th September 2017)
- strong background in control systems
- solid programming skills in Matlab
- fluency in English (written and verbal)
- ability to work independently

Desirable:

- Master’s degree (at Merit/Distinction level) in engineering or a relevant subject
- knowledge of MPC, numerical optimisation techniques, and/or modelling of energy storage systems
- experience with interfacing control systems with physical processes (e.g. using dSPACE)

Detailed information and application procedure:

<https://www2.le.ac.uk/colleges/scieng/research/pgr/oct-2017/engineering/rubagotti>

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### **5.11. PhD: European Southern Observatory, Germany**

Contributed by: Niek Doelman, [niekdoelman@strw.leidenuniv.nl](mailto:niekdoelman@strw.leidenuniv.nl)

The European Southern Observatory (ESO) invites applications for a PhD position in Adaptive Optics Systems Engineering on ‘Advanced Control Laws for Exoplanet Imaging Adaptive Optics’.

The successful applicant will be part of the Adaptive Optics Systems Group (SAOSY) of the System Engineering Department within the Directorate of Engineering. SAOSY supports telescope and instrument projects at ESO for what regards Adaptive Optics with the ultimate goal to provide the ESO astronomical community with worldwide competitive ground-based Adaptive Optics (AO) observing capabilities overcoming the limitation of atmospheric turbulence. The direct imaging of potentially habitable Exoplanets is one prime science case for ESO's 39-m Extremely Large Telescope, the E-ELT. In order to reach this demanding science goal with the dedicated instrument PCS (planetary camera and spectrograph), a comprehensive R&D programme for the key technologies has been developed. SAOSY is involved in the R&D of the extreme Adaptive Optics (XAO) system, which will control many thousands of actuators at a frame-rate of several Kilohertz. In order to achieve the highest possible imaging contrast, two major terms of XAO error budget have to be minimized:

A) The chromaticity of the refractive index of air leads to slightly different optical wavefronts at the science wavelength (NIR) and the AO wavefront sensing wavelength (red optical). The difference shows up as a residual wavefront error, which is proportional to the incoming uncorrected wavefront and dominates the error budget at the smallest angular separations.

B) The finite temporal correction bandwidth of the XAO system leads to an imperfect correction of very rapid changes of the wavefront, which dominate the residual error at somewhat larger angular separations.

#### Task Description

The student will first be asked to investigate how to minimize the effects of refractive index chromaticity and temporal bandwidth error on the XAO residual image by analyzing the nature of the problem. S/he will then propose adapted control algorithms and strategies to cope with the errors. After developing the concepts and verifying them through numerical simulations, the student should confirm the effectivity of the proposed concepts by experiment. ESO's Adaptive Optics laboratory provides a versatile test environment, the high-order test-bench (HOT), for this purpose. It might also be possible to implement and test these advanced control algorithms at the telescope using the SPHERE high-contrast imaging instrument at the VLT in Chile.

For further information, see <https://recruitment.eso.org/>.

Closing date for applications is 12 May 2017.

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### 5.12. PhD: Technical University of Kosice, Slovak Republic

Contributed by: Ivo Petras, [ivo.petras@tuke.sk](mailto:ivo.petras@tuke.sk)

PhD: Technical University of Kosice, FBERG, Slovak Republic

Multiple PhD positions in Process Control

PhD candidates should have a strong background in control engineering with an experience in mathematical modeling of systems. The topics of these positions are related to the fractional calculus and its application in mathematical modeling and control of systems.

Required qualifications of candidate:

- 1) Master degree in control engineering, electrical engineering, applied mathematics, or a related field
- 2) Excellent communication skills in English
- 3) Proficiency in some scientific programming language, such as MATLAB, or C/C++, etc.

To express interest, please send the following documents:

- 1) One page cover letter describing your research interests and background

- 2) CV or resume with contact details
- 3) Name and email of two references

To apply and for further information on positions, contact: prof. Ivo Petras,  
ivo.petras@tuke.sk

Closing date for applications: 31.05.2017

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### **5.13. PhD: University of Stuttgart, Germany**

Contributed by: Frank Allgower, [frank.allgower@ist.uni-stuttgart.de](mailto:frank.allgower@ist.uni-stuttgart.de)

PhD: University of Stuttgart, Germany

Multiple PhD positions in Intelligent Systems, including Control, at the new International Max Planck Research School for Intelligent Systems in Stuttgart and Tübingen, Germany

The Max Planck Institute for Intelligent Systems and the Universities of Stuttgart and Tübingen are collaborating to offer a new interdisciplinary Ph.D. program, the International Max Planck Research School for Intelligent Systems. This new doctoral program is starting in fall 2017 and will enroll about 100 Ph.D. students over the next six years.

This school is a key element of the state's "Cyber Valley" initiative to accelerate basic research and commercial development in the broad field of artificial intelligence. Students are sought who want to earn a doctorate in the broad area of intelligent systems, including control systems.

The participating faculty are Frank Allgower, Matthias Bethge, Michael J. Black, Andres Bruhn, Peer Fischer, Andreas Geiger, Philipp Hennig, Katherine J. Kuchenbecker, Hendrik Lensch, Georg Martius, Ludovic Righetti, Stefan Schaal, Bernhard Scholkopf, Metin Sitti, Alexander Sprowitz, Ingo Steinwart, Marc Toussaint, Ulrike von Luxburg, and Felix Wichmann.

Intelligent systems that can successfully perceive, act, and learn in complex environments hold great potential for aiding society. To advance human knowledge in this domain, we need doctoral students who are curious, creative, and passionate about research to join our school. Learn more at <http://imprs.is.mpg.de>

All aspects of the program are in English. You may join our program in late summer or early fall 2017. You will be mentored by our internationally renowned faculty. You will register as a university graduate student and conduct research for approximately three years. You can take part in a wide variety of scientific seminars, advanced training workshops, and social activities. Your doctoral degree will be conferred when you successfully complete your Ph.D. project. Our dedicated coordinator will assist you throughout your time as a doctoral student.

People with a strong academic background and a master's degree in Engineering, Computer Science, Cognitive Science, Mathematics, Control Theory, Neuroscience, Materials Science, Physics, or related fields should apply.

We seek to increase the number of women in areas where they are underrepresented, so we explicitly encourage women to apply. We are committed to employing more handicapped individuals and especially encourage them to apply. We are an equal opportunity employer and value diversity at our institutions.

Admission will be competitive. If selected, you will receive funding via an employment contract, subject to the rules of the Max Planck Society and the two participating universities.

In case of interest, please specify the desired main academic advisor with your application.

You can apply at <http://imprs.is.mpg.de> before midnight PST on April 17, 2017.

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#### 5.14. PostDoc: National University of Singapore, Singapore

Contributed by: Shuzhi Sam Ge, [samge@nus.edu.sg](mailto:samge@nus.edu.sg)

Post-doctoral Research Fellow Positions at National University of Singapore on Learning Control of Semi-submersible Floatel under Shielding Effects

Job Place:

Robotics Research Lab/Social Robotics Lab, Electrical and Computer Engineering, National University of Singapore

Job Description:

Demand by use of floatel system to do maintenance of aging FPSOs (Floating Production Storage and Offloading) is expected to substantially increase in the near future. To ensure the smoothness, safety and efficiency of operation between floatel and FPSO, constant relative position and orientation between the floatel and FPSO has to be kept. Controlling the floatel becomes challenging once we consider the large amount of shielding effects due to FPSO in the vicinity. The research project will develop robust adaptive learning control schemes to compensate the shielding effects on the floatel and design an appropriate robust dynamic positioning control system for floatel to counteract against the environmental load and also react to follow with FPSO low frequency yaw motion.

Prospective candidates applying for this position will join a team working with researchers from both NUS and the offshore industry to develop control algorithms and software packages to maintain the relative position of the floatel. In particular, 1) a robust adaptive control scheme to be developed to compensate for shielding effects on the floatel; 2) a high fidelity and efficient simulation software package to be developed to assist control designing and verification process, and provide understanding for actual implementation.

Qualifications:

- Post-doctoral Research Fellow on Intelligent Control Design and Development
  - Active, energetic and optimistic young researcher.
  - PhD in with a background in control modelling and designing.
  - Strong mathematics and good programming skills.
  - Excellent communicator, ability to working in great team and learn quickly and enthusiastically.
  - Project management experience
  - Preferably working experience on software development and system integration in relevant subjects.
- Post-doctoral Research Fellow on User-friendly Dynamic Positioning Simulation Software Development
  - Active, energetic and optimistic young researcher.
  - PhD in with a background in electrical engineering.
  - Good mathematics and Strong programming (C/C++) skills.
  - Excellent communicator, ability to working in great team and learn quickly and enthusiastically.
  - Project management experience
  - Preferably working experience on software development and system integration in relevant subjects.

Remunerations will be commensurate with qualifications and experience. Qualified candidates are invited to express their interest in applying the position by sending us the following documentations to us by email: [samge@nus.edu.sg](mailto:samge@nus.edu.sg):

1. Detailed CV (resume).
2. Copies of recent representative works (publications, project summaries and etc).
3. Any other supporting documents that can display working experiences in related areas.

Shuzhi Sam Ge

Professor, Fellows of IEEE, IFAC, IET, and Academy of Engineering (SG),  
Director of Robotics Research Laboratory/ Social Robotics Laboratory,  
National University of Singapore

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### **5.15. PostDoc: Cornell University, USA**

Contributed by: Elaine Shi, [elaine@cs.cornell.edu](mailto:elaine@cs.cornell.edu)

The Computer Science Department of Cornell University is seeking a postdoctoral researcher to work on the security of Cyber-Physical Systems. The postdoctoral researcher will be hosted in Cornell University, Ithaca, NY.

An ideal candidate for this position should have or be expecting a Ph.D. degree or equivalent from Computer Science, Electrical Engineering, or equivalent, and should be familiar with a subset but not necessarily all of the following:

- secure software/hardware systems
- program analysis
- cyber-physical systems
- control systems

The postdoctoral position is for 1 year and based on performance, renewable up to 3 years.

To apply for this position, please contact Prof. Elaine Shi (elaine at cs dot cornell dot edu). There is no deadline for application.

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### **5.16. PostDoc: Luleå University of Technology, Sweden**

Contributed by: George Nikolakopoulos, [geonik@ltu.se](mailto:geonik@ltu.se)

Post Doctoral position in control engineering with specialization in robotics

[Ref: 1069-2017]

The Robotic Team of the Control Engineering Group (CEG) at the Department of Computer Science and Electrical and Space Engineering at Luleå University of Technology, is now looking for one Post Doctoral contributing to our growing activities in the area of aerial and ground robotics. The candidate will be part of a strong research team with intense expertise in the area of aerial field robotics and will have the pleasure to work in multiple European and National research projects in Robotics, while contributing to the vision and goals of the group. The contract for this position will be one year, with possibility to be extended up to 2 years in total.

Project description

Characteristic, but not limited, research topics will focus in the following areas:

- Vision for Robotics
- Multiple camera views cooperative perception for UAVs
- Collaborative SLAM
- Cooperative Task allocation, scheduling and planning
- Aerial cooperative Visual Servoing
- Augmented Reality for robotics
- Event based constrained remote control

- Safe and robust navigation for aerial and ground robots in featureless or reduced feature environments (e.g. mines)
- Visual Odometry on low light environments
- Environmental perception and online mission configuration for UAVs
- 6D real time Localization for aerial and ground robotic applications in mines
- Ultra Wide Band Localization
- Field Robotics demonstration of the corresponding research topics outcomes

**Qualifications:**

The research tasks require a solid mathematical background with proven advanced experimental capabilities and excellent programming skills (e.g. C++). The candidate should have a strong vision to evaluate and demonstrate the research findings in real life operating conditions, in an approach to close the gap among pure theory and experimental verifications. Part of the everyday work of the Post Doc will be also linked with management of the LTU tasks in the project Horizon 2020 project SIMS (<http://www.simsmining.eu/>). A PhD diploma in engineering is also a must to have qualification.

**Duties:**

The ideal candidate 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 MSc students, teaching and support in acquire funding for future research projects from research funding agencies/councils, EU framework program or industry. The candidate will need to represent the group in different occasions, both in Sweden and abroad, as well as to have an excellence in speaking English.

**Information:**

For further information, please contact Professor George Nikolakopoulos +46 920 491298, [geonik@ltu.se](mailto:geonik@ltu.se)

Union representatives: SACO-Daina Dagens Daina.Dagis@ltu.se , +46 (0)920-493880 and OFR- Lars Frisk, [Lars.Frisk@ltu.se](mailto:Lars.Frisk@ltu.se) +46 (0)920-491792

Luleå University of Technology is actively working on equality and diversity that contributes to a creative study- and work environment. The University's core values are based on respect, trust, openness and responsibility.

**Application:**

Final day to apply: 2017-04-10

Application URL: <https://www.ltu.se/ltu/Lediga-jobb?l=en&rmpage=job&rmjob=2183&rmlang=UK>

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**5.17. PostDoc: University of Leicester, UK**

Contributed by: Matthew Turner, [mct6@le.ac.uk](mailto:mct6@le.ac.uk)

Post-doc: University of Leicester, UK

Applications are invited for a post-doctoral research associate in the area of constrained adaptive control systems. The research is funded by the EPSRC and is available until February 2019. The successful candidate will have a good first degree in a relevant subject (engineering, mathematics or computer science) and have, or be in the process of completing, a PhD in an area of control engineering. The candidate should have a good understanding of nonlinear control systems and some experience with constrained control systems and, in particular, anti-windup would be advantageous. The research associate will be encouraged to scrutinise carefully adaptive control algorithms and so applications will be welcomed from both candidates with a traditional adaptive control background, but also from candidates with experience in other relevant

areas such as robust control. Part of the work will involve the development and assessment of adaptive control algorithms for constrained systems, and part of the work will be practical, involving the validation of these algorithms on real systems. The post would therefore suit candidates with both strong theoretical backgrounds and also an appreciation of practical implementation of controllers.

Application: Please follow the process described at:

[http://ig5.i-grasp.com/fe/tpl\\_UniversityOfLeicester01.asp?newms=jjid=98852&aid=14178](http://ig5.i-grasp.com/fe/tpl_UniversityOfLeicester01.asp?newms=jjid=98852&aid=14178)

Informal enquiries: Dr. Matthew Turner ([mct6@le.ac.uk](mailto:mct6@le.ac.uk))

Closing date: 13th April 2017

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### **5.18. Research Fellow: University of Hull, UK**

Contributed by: Ron J Patton, [r.j.patton@hull.ac.uk](mailto:r.j.patton@hull.ac.uk)

Research Fellow: Fault-tolerant control and dependable systems engineering

The University of Hull, Kingston-upon-Hull, UK

Deadline for applications: 18th April.

Following the very successful developments led by Professor Ron Patton the University of Hull has available a full-time Senior Research Fellowship in Fault-tolerant Control for a 5 year fixed term structured-research development programme period from June 1st 2017.

This is one of seven important research only fellowships being offered by the University within a developing research institute focused on the interface between sustainable energy and environmental resilience.

A researcher with suitable focus and experience in fault tolerant control will make an important contribution to a rapidly growing team of expertise in the application of control and dependable engineering systems to renewable marine energy systems (wave, wind, tidal). The research will continue a strategy of developing overseas partnerships with other international research teams focussed on the enhancement of sustainable, reliable, efficient and dependable fault tolerant control operation, using advanced control methods encompassing robustness, nonlinear strategies, adaptive control estimation.

We welcome applicants who are engaged in research fellowships in the UK or abroad who have a substantial record of appropriate archival publication and who have proven ability to attract research grant funding. Information about the application procedure can be found at:

<http://www.jobs.ac.uk/job/AYC766/university-research-fellowships/>

Please contact Professor Ron Patton for further information about the fellowship role.

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### **5.19. Faculty: Delft University of Technology, The Netherlands**

Contributed by: Rudy Negenborn, [r.r.negenborn@tudelft.nl](mailto:r.r.negenborn@tudelft.nl)

Assistant Professor "Quantitative Methods for Large-Scale Transport Systems and Logistics"

The Dept. of Maritime & Transport Technology at Delft University of Technology (TU Delft) is seeking an Assistant Professor of Quantitative Methods for Large-Scale Transport Systems and Logistics, with a particular fascination in control for large-scale (stochastic) vehicle routing and waterborne/maritime/port applications.

You will work on challenges at the equipment, system, and network levels. You will make an active contribution to the group's research and education curriculum for both the Bachelor and Master programmes.

You will develop and give lectures and supervise Master students in their final year. Initiating and carrying out high-level research projects and publishing research in leading journals are essential parts of the job.

Applicants should have the following qualifications:

- A PhD and strong track record in the domain of large-scale transport engineering and logistics;
- Knowledge of (stochastic) vehicle routing, operations research, mathematical modelling, (distributed) control & optimisation heuristics, relevant simulation and analysis software;
- Excellent scientific credentials;
- Experience with and ability to work in teams in an academic, interdisciplinary environment with mechanical engineers as well as people in other disciplines;
- Excellent didactic qualities and experience in teaching.

A tenure-track position is offered for six years. Based on performance indicators agreed upon at the start of the appointment, a decision will be made by the fifth year whether to offer you a permanent faculty position.

See for more application information:

<https://www.academictransfer.com/employer/TUD/vacancy/39049/lang/en/>

Application deadline: May 1, 2017

For more information about this position, please contact:

Rudy Negenborn,  
Associate Professor  
Control & Coordination for Real-Time Logistics  
Delft University of Technology, The Netherlands  
phone: +31 (0)15-2786718  
e-mail: R.R.Negenborn@tudelft.nl.

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### **5.20. Faculty: IMT School for Advanced Studies Lucca, Italy**

Contributed by: IMT School for Advanced Studies, [scouting@imtlucca.it](mailto:scouting@imtlucca.it)

IMT School for Advanced Studies Lucca invites expressions of interest for positions in Cyber security at different levels of seniority, from early career onward. Candidates should have experience or willingness to work in the area of cyber security broadly construed, ideally complementing IMT's current strengths. Topics of interest include (but are not limited to):

- access control;
- distributed ledgers;
- formal verification of security protocols;
- network security;
- security requirements elicitation;
- web security.

Since multidisciplinary research is a founding value of the School, inclination to work at the intersection with other core disciplines of IMT relevant to cybersecurity will be considered an asset. We seek to hire fixed-term (i.e., non tenure-track) and tenure-track assistant professors and tenured associate professors.

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### **5.21. Faculty: IMT School for Advanced Studies Lucca, Italy**

Contributed by: Alberto Bemporad, [alberto.bemporad@imtlucca.it](mailto:alberto.bemporad@imtlucca.it)

Assistant Professor position in Systems, Control, and Optimization at IMT Lucca.

IMT School for Advanced Studies Lucca invites expressions of interest for an Assistant Professor position (“Type-A Ricercatore”) to carry out research in the areas of systems, control, and optimization. Research experience is expected in one of the following areas: control systems, numerical optimization, systems identification, machine learning. Research experience in model predictive control or convex optimization will be considered as a plus.

Candidates must have an excellent record of high-impact international publications and demonstrate enthusiasm for performing research. Activities include: research, tutorship and mentoring of PhD students, graduate teaching. The successful candidate will be part of the research unit Dynamical Systems, Control and Optimization (<http://dysco.imtlucca.it/>) at IMT Lucca.

The position is for 3 years, extendable for further 2 years. The indicative starting gross salary is EUR 34.898/year, net income may vary depending on income taxes, local taxes, retirement plan, health care deduction and tax exemptions. New employees who have worked in research-based positions abroad for the past two years may be eligible for a substantial tax rebate for the first three fiscal years of employment.

IMT School for Advanced Studies Lucca (<http://www.imtlucca.it>) is a public graduate school and research institute, ranked #1 among all public Italian universities for quality of research in the last national research evaluation. IMT is an interdisciplinary research environment, blending scientific competencies of management science, engineering, computer science, neuroscience, physics, and management of cultural heritage, striving to reach the fusion of theoretical comprehension and practical relevance in concrete applications. The working language at IMT Lucca is English.

For further information about the position, applicants can refer to the website <https://www.imtlucca.it/school/job-opportunities/academic/international-scouting>

The deadline for applications is June 5, 2017.

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## 5.22. Engineer: CROASAEN, USA

Contributed by: Eunjeong Lee, [elee@croasaen.com](mailto:elee@croasaen.com)

CFD Engineer: CROASAEN

Harvard robotics startup CROASAEN (Create Robots and Save Energy) is looking for research scientists with strong background on Computational Fluid Dynamic simulations inside gas, oil, or multi-phase pipelines.

We are developing a bi-directional internal pipeline repair/inspection robot for oil/gas industry. Our motivation to develop an internal pipeline repair robot stems from the needs to mitigate methane emission from pipelines for climate change, and the desire to ensure pipeline safety to protect life and infrastructures from accidents. Our world-class team aims to commercialize our robot by 2019. Our operation involves global manufacturers and super oil major companies in the US, France, Netherlands, Germany, Korea, Norway, China, Saudi Arabia, Switzerland, etc. We are located in Cambridge, MA, the center of creativity, innovation, and entrepreneurship. We contribute more than ten percent of our equity to educational outreach for the Middle Eastern refugees in Europe. We offer a generous compensation and stock option.

If you are a highly talented CFD scientist, please join us to design and analyze the robot operation inside live oil and gas pipelines.

Job Responsibilities

- Perform CFD analysis on the robotic system in gas, oil, or multi-phase pipeline flows
- Help design robot components based on the CFD analysis

- Work with robotics and control engineers to iteratively predict performance and improve designs through detailed CFD simulations and experiments
- Work with testing engineers to cross validate test results and CFD simulation results
- Create simulation reports and provide design recommendations
- Publish in prestigious journals and conferences
- Write proposals

#### Qualifications and Desired Skills

- MS or PhD in Mechanical Engineering, Aerospace Engineering, Ocean Engineering, or related field
- 2+ years of industry/academic experience in CFD
- Strong CFD capability is a must (ANSYS, OpenFOAM, or both)
- CFD experiences with rotating turbo-machinery strongly desired
- Strong CFD experience for robotic propulsion or robotic fish is desirable
- Creativity, imagination and innovation
- Strive to perform at the highest level and challenge the impossible
- Experience in soft robotics or robotic fish is a plus
- Familiarity with 3D CAD modeling (preferably SolidWorks) is a plus
- Consideration for others to work as a team and self-motivation
- Ability to work with a fast-paced development schedule for commercialization
- Strong verbal and written communication skills

Application: send CV and cover letter to Eunjeong Lee, elee@croasaen.com

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