

To Control, with Love

I feel most honored to be writing this article, the first in my capacity as the 2017 president of the IEEE Control Systems Society (CSS). Holding the position of president of such a great Society is not something I imagined doing at some point in my life, let alone planned for. Yet I find myself in this surreal predicament of addressing my professional society as its president, almost at a loss for words.

Practically all service positions in the CSS are volunteer ones (no, I don't "earn the big bucks"). So how does one end up being the president? I can't answer this question in generalities—the journey varies for different people. Perhaps it is useful for me to recount my own journey.

ENTERING SYSTEMS AND CONTROL OR "HOW I BECAME A CONTROL FREAK"

I completed my undergraduate education at the University of Adelaide, South Australia, in 1987 (g'day, mate!). When I first encountered control theory and systems in my third year, it became clear that this was a topic I had always been waiting to study. While in secondary (high) school in Malaysia, I was very active as an electronics hobbyist and was even a founding member of our school's first electronics club. So by the time I entered the electrical and electronics engineering program in 1984, I was well versed with designing, building, and testing electronic circuits. I even had a personal computer—a TRS-80—named for the Z-80 microprocessor it



Edwin Chong at the 2015 IEEE Conference on Decision and Control banquet, Osaka, Japan.

contained. What I had not (and could not have) studied in high school was the application of systems theory (for example, signals and transfer functions) to the study of control.

I completed my undergraduate education having taken several classes in control theory and methods, including one on adaptive control taught by Mike Gibbard based on the book by Goodwin and Sin [1]. So when I entered graduate school, I naturally was drawn toward systems and control theory. Even so, I could not have foreseen that I would end up completing my Ph.D. degree in 1991 from Princeton University under Prof. Peter Ramadge, who was once a student of Graham Goodwin.

IN SERVICE TO CSS OR "HOW DOES ONE END UP AS CSS PRESIDENT ANYWAY?"

Like many others, I was a reviewer for IEEE journals and conferences while

I was doing my Ph.D. My first seriously demanding technical service position in the CSS was in 1994, when I joined the newly formed Conference Editorial Board (CEB). Serving in the CEB continues to be a key way to begin CSS service. In the same year, I became chair of the Working Group on Discrete-Event Systems, part of the Technical Committee on Control Theory (which I later chaired). I remained chair until 1999, when the Technical Committee on Control Theory ended, at which time I became the inaugural chair of the newly formed Technical Committee on Discrete-Event Systems, which remains active today [2].

In January 1995, I joined the editorial board of *IEEE Transactions on Automatic Control* as an associate editor, a highly coveted position on the editorial board of our society's flagship journal and one I held until the



Edwin Chong enjoying a drink with 2016 CSS Executive Committee members in Munich, Germany.



Edwin Chong with past CSS President Yutaka Yamamoto and incoming IFAC President Frank Allgower in London, May 2014.

end of 1997. Without question, this was a demanding and sometimes thankless job. Even so, in 2009, I joined the board again, this time as an associate editor-at-large. This post was eliminated from the editorial board that same year, so I became an inaugural senior editor. I held this position until the end of 2016, and I continue to work unofficially on the editorial board today.

I have also served CSS many times in conference organization. I was on the Program Committee of the IEEE Conference on Decision and Control

(CDC) in 1993–1995, 1998, and 2000; the International Symposium on Intelligent Control in 1996; and the American Control Conference (ACC) in 1999. My first time on a conference operating committee was as ACC registration chair in 1998. I served in the same position for the CDC in 2001 and again in 2003. I moved on to the position of CDC finance chair in 2006, 2008, and 2009. For the 2004 CDC, I was Technical Program vice-chair for invited sessions. With all this service experience under my belt, I served as general chair of

the Joint 50th IEEE Conference on Decision and Control and European Control Conference in 2011.

In 2006, I was elected to the CSS Board of Governors (BoG) and served until 2008. My second term on the BoG was from 2009 to 2012. In 2012, I joined the CSS Executive Committee when I became vice president for Financial Activities, a position I held for two consecutive terms, until 2014. In 2016, I joined the Executive Committee again, this time as president-elect. And so here I am as president in 2017.

It was helpful for me to recount what seems to be a winding history of my service in CSS, to get a sense of how it all happened, how I got here. While not everyone will want to get involved in CSS in the same way, I think that everyone has some role to play. There are many important and highly impactful positions in CSS, perhaps even more so than being the president. Serving our community is not only a unique honor—it comes with a wealth of personal growth and enrichment.

CSS EXECUTIVE COMMITTEE OR “WHO REALLY RUNS CSS?”

I am privileged to be serving our Society together with a wonderful team: the Executive Committee (fondly known as the ExCom). Francesco Bullo is the current president-elect, and Frank Doyle remains on the ExCom for one more year as past president. Maria Prandini continues a second year as vice president for Conference Activities. New to the job of vice president for Financial Activities is Magnus Egerstedt. Also new to the ExCom is Li-Chen Fu, vice president for Member Activities. The position of vice president for Publication Activities is now held by Thomas Parisini, who has served in various CSS publication positions for years. Anu Annaswamy rejoins the ExCom for a second tour in 2017, this time as vice president for Technical Activities. And we are most

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size mobile robot. In this case, the algorithm is applied to the underlying configuration space, rather than to the work space. The required information includes “simulation” of tactile sensing in the configuration space which is accomplished via covering the perimeter of the real robot with tactile sensors. Better yet, the algorithm can be further improved by making use of richer sensing media, such as range sensing or vision. The resulting sensor-based planning algorithm, called *VisBug* [4], was shown to deliver a quite reasonable performance in complex environments. The main idea of the version of *VisBug* used in this work is to continuously identify the furthest point of the Bug2 path that has a clear path to it and then proceed directly to that point.

To date TRC has installed HelpMates in several hospitals including Danbury Hospital, Danbury, CT, Downey Hospital, Downey, CA, and Mt. Sinai Medical Center, New York, NY. In some hospitals HelpMate is in

The objective of the hospital transport mobile robot, HelpMate, is to carry out such tasks as the delivery of off-schedule meal trays, lab and pharmacy supplies, and patient records.

operation 24 hours per day and is being used for the delivery of meal trays, lab supplies, etc. The hospitals are reporting an increase in productivity and efficiency due to the HelpMate and are finding it to be cost effective.

FURTHER RESEARCH

The currently available results of the HelpMate testing indicate that the chosen navigation system provides a performance that is suitable for the chosen environment. This work has also identified areas in need of further research. For example, more alternatives for registration would

provide more reliable position and heading estimation. More “intelligence” in obstacle avoidance would be desired—it would help, for example, if the robot could at a distance distinguish between stationary and moving obstacles.

REFERENCES

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» PRESIDENT’S MESSAGE (continued from p. 10)

fortunate to have Ragu Balakrishnan as our tireless director of Operations. Without the dedication of these highly skilled executives, our Society could not operate. I am extremely thankful for the opportunity to be working closely with such a distinguished group of colleagues.

Of course, it’s far from the case that only the ExCom runs CSS. The Society would be nothing without the countless hours spent by volunteers, ranging from reviewers, to associate editors, to conference organizers. If nobody has ever thanked them before, then let me be the first: thank you!

DIVISION X OR “WHAT DO DIVISIONS HAVE TO DO WITH US?”

In the recent IEEE ballot, you might recall coming across the role of *divi-*

sions in IEEE. Every technical Society and Council within IEEE is part of a division. CSS is a part of Division X. The Societies and Councils within Division X are basically our closest relatives (in an organizational sense). In fact, when I attended a Division X gathering in 2016 (for the first time), I was told that CSS is viewed as a “parent” Society of Division X because several other Societies in the division were spawned from CSS (you might call this *multiplication within a division*). These include the Computational Intelligence Society; the Robotics and Automation Society; the Systems, Man, and Cybernetics Society; and the Systems Council. The other organizations within Division X are the Biometrics Council, the Engineering in Medicine and Biology Society, the Sensors Council, and the Photonics

Society. All the divisions (ten of them) form a major component of the Technical Activities Board (TAB) [3].

EPILOGUE

I started this article almost at a loss for words. I am now ending it with what I feel most deeply about being your president: I am at your service.

REFERENCES

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