E-Letter on Systems, Control, & Signal Processing
Issue 385, September 2020

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Welcome to Issue 385 of the CSS E-letter available here.

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

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

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1 IEEE CSS Headlines

1.1. Become a CSS Member

Contributed by: Ahmad Taha, ahmad.taha@utsa.edu

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

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1.2. Follow the CSS Social Media Accounts

Contributed by: Ahmad Taha and Ankush Chakrabarty ahmad.taha@utsa.edu, chakrabarty@merl.com

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

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1.3. CSS Technically Cosponsored Events

Contributed by: Luca Zaccarian, CSS AE Conferences, zaccarian@laas.fr

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

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

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

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

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

- 39th Chinese Control Conference (CCC2020). Shenyang, China. July 27-29, 2020. http://www.ccc2019.cn/en/index.html

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

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1.4. CSS Publications Content Digest

Contributed by: Kaiwen Chen, kaiwen.chen16@imperial.ac.uk

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

The CSS Publications Content Digest, available at
http://ieeecss.org/publications-content-digest
provides lists of current tables of contents of the periodicals sponsored by the Control Systems Society. Each issue offers readers a rapid means to survey and access the latest peer-reviewed papers of the IEEE Control Systems Society. We also include links to the Society's sponsored Conferences to give readers a preview of upcoming meetings.

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1.5. IEEE CSS Outreach Fund: Fall Solicitation

Contributed by: Antonella Ferrara, antonella.ferrara@unipv.it

IEEE Control Systems Society (CSS) Outreach Fund Fall Solicitation

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

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

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

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

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

IEEE Control Systems Society Outreach Fund

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

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

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

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1.6. ACC 2021 Call for Tutorials

Contributed by: Sahika Genc, sahika@amazon.com

Call for Tutorials at the American Control Conference in 2021

Call For Tutorials: The main purpose of the Industry and Applications Tutorial Sessions at the American Control Conference is outreach to industry to share state-of-the-art control approaches and theory in real-world engineering applications and practice to our controls community at large. You can expect your audience to be conference participants from academia, government and industry as well as students of control.

Contributions mostly include industry and government participants to provide maximum exposure to commercial and governmental application of control theory and techniques, but tutorial sessions organized by academia is also encouraged if it offers and demonstrates useful techniques and methods towards practical applications of control.

Tutorial sessions attempt to engage industry experienced, practicing control engineers to introduce control applications in areas that others may not even be aware of; a valuable and useful experience for academia, students and other industry participants. Contributors have the opportunity to help 'bridge the gap' so often referred to between the theory academics offer and the actual practice in industry by introducing new methods and techniques or by filling in details that academic coursework may have overlooked.

Deadlines: Paperplaza is now open for proposal, paper and abstract submissions: The link for contributions to the 2021 American Control Conference is now active here:

https://css.paperplaza.net/conferences/scripts/start.pl

Bookmark this link and consider this tip: Upload your Tutorial session proposal and paper as early as possible, even if it's not done. You are allowed to reload your proposal, paper and abstracts up to the deadline. Even if your work is not 100% complete you can go through the submission process ahead of time to make sure everything is working OK, and to ask questions if you have any problems. That way you're not having to struggle at the last minute with administrative issues. Then at your leisure, polish your work, and upload as many times as needed - up to submission deadline.

- Initial Manuscript Submission Deadline: September 14, 2020
- Accept/Reject Notice: January 24, 2021
- Final Submission Deadline: March 15, 2021

A "Getting Started, Manual for Authors" including all the information required for preparing is located here:
http://css.paperplaza.net/conferences/manuals/authorgetstarted.pdf

How to prepare your proposal? Role of the Session Organizer

The organizer can be from industry, government or academia. They do not necessarily need to be the per-

son delivering the main tutorial talk, but they are responsible for planning session structure, identifying, recruiting and managing other supporting speakers, and submitting the session proposal. For tutorial sessions we encourage the collaboration of industry or government with academia to help bridge the theory-practice gap.

Proposal Structure: The Tutorial Session Proposal need only be one to two pages in length. It must include the Tutorial Session Title and clearly detail the purposeand brief description of the tutorial content. The proposal must include the name of the organizer(s), the name of the main tutorial speaker, the supporting speakers, their professional affiliations, the titles of their talks and abstracts. The proposal should state whether the supporting speakers are submitting a paper or simply an abstract. For supporting speakers at least an abstract is required to represent their talk.

Session Structure: While the organizer is allowed to vary structure, tutorial sessions typically begin with the main tutorial talk which comprehensively covers the topic. The main talk is usually longer, typically 40 to 60 minutes. The main tutorial is followed by several shorter supporting talks, 20 minutes in length addressing more specific, detailed areas of the topic. The session total duration is 2 hours. So planning for the number of speakers to recruit needs to keep this in mind. Some sessions have used the final time slots for panels that further discuss the topic between speakers and/or take questions from the audience. In any event, planning should include some time for questions.

Papers: While we encourage all presenters of the tutorial session to submit a paper for their talk, only the main tutorial paper is required. Supporting speakers must at least submit an abstract for their talk. The main tutorial paper, supporting papers or abstracts for the Tutorial Session must all be submitted at the same time the session proposal is submitted, before the Initial Manuscript Submission deadline. All papers submitted will undergo peer review by the program committee, so papers must be in 'good shape' on the date of initial submission.

All tutorial papers (main and supporting papers) are permitted to contain more pages than the regular conference paper page limit and are limited to 18 pages without additional page charges. The main tutorial paper in particular should be 'substantial' in size and content since it generally accounts for the main talk which is typically longer as noted above. 18 pages has been chosen as the limit for two reasons: (1) it's generally difficult to recruit peer reviews if the papers are too long and (2) Paperplaza is currently programmed for this limit. If for any reason more than 18 pages is required please contact the VC of Industry and Applications by email to explain your needs. If supporting speakers intend to submit papers rather than abstracts they must submit their papers for review by the initial submission deadline. If supporting speakers submit only abstracts on the initial submission, papers on the final submission are not allowed. All papers submitted in the Tutorial Session should be presented in standard ACC format (see "Getting Started, Manual for Authors" link below), and if accepted will be published in the conference proceedings.

The interested individuals can contact me at sahika@amazon.com for guidance and questions.

Sahika Genc, Ph.D.
Amazon Web Services, Artificial Intelligence
Principal Applied Scientist, Seattle, WA

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1.7. CDC 2020 Online Program, South Korea

Contributed by: Hideaki Ishii, ishii@c.titech.ac.jp

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

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

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

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

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

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

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

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

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

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

presentations. For details, please visit the conference website.

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

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

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

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2 Miscellaneous

2.1. Online FoRCE Seminar: Geir E. Dullerud

Contributed by: Tansel Yucelen, yucelen@usf.edu

Online FoRCE Seminar: Geir E. Dullerud (September 18, Friday, 12pm Eastern Time)

We are pleased to let you know that Dr. Geir E. Dullerud from University of Illinois will give an online FoRCE seminar on September 18, Friday, 12pm Eastern Time. His talk title is: Statistical Validation and Principle-Based Simulation of Complex Cyber-Controlled Systems (see below for the abstract and the bio of Dr. Dullerud).

To connect Dr. Dullerud's online seminar, use the following WebEx link:

https://force.my.webex.com/force.my/j.php?MTID=m00361f653ab03357f259a6fa6163896b

- Meeting number (access code): 126 816 2509

- Meeting password: PGmPpWv2J65 (74677982 from phones and video systems)

Note that the above link will be activated 15 minutes before the online seminar.

Dr. Tansel Yucelen
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Tansel.Yucelen (Skype); twitter.com/TanselYucelen; youtube.com/c/tyucelen

Abstract: The presentation will focus on a simulation and computational approach to verification of the hybrid mathematical models that are formed when combining physics-based models, with discrete-transition models such as those which model software algorithms. Namely, the mathematical models that arise when for instance considering Cyberphysical Systems, or the Internet-of-Things. In many game theory, filtering problems and verification problems it is not possible to analytically obtain solutions for statistical properties of systems under study. In the first section of the talk will concentrate on system verification, and will present a new verification algorithm for continuous-time stochastic hybrid systems, whose specifications are expressed in metric interval temporal logic (MITL), by deploying a novel model reduction method. By partitioning the state space of the hybrid system and computing the optimal transition rates between partitions, we provide a procedure to both reduce the system to a continuous-time Markov chain, and the associated specification formulas. We prove that the unreduced formulas hold (or do not) if the corresponding reduced formula on the Markov chain is robustly true (or false) under certain perturbations. In addition, a stochastic algorithm to complete the verification has been developed. We have extended the approach of this algorithm, and have developed a direct stochastic algorithm for probabilistically verifying a certain hybrid system class, and applied this technique to an extensive benchmark problem with realistic dynamics. In the second part of the talk we will describe our recent work on numerical approaches to ob-

taining estimates of statistical properties of Markov processes, in particular mean-square estimation. Monte Carlo simulation of Markov processes allows the numerical estimation of their statistical properties from an ensemble of sample system paths. We present methods for generating reduced-variance path ensembles for the tau-leaping discrete-time simulation algorithm, which allows mean stochastic process dynamics to be estimated with substantially smaller ensemble sizes. Our methods are based on antithetic and stratified sampling of Poisson random variates, and we provide a combination of analytical proofs and numerical evidence for their performance, which can frequently be a 2-3 orders of magnitude improvement over standard Monte Carlo. Also presented will be the HoTDeC multi-vehicle, which consists of indoor airborne and ground-based vehicles.

Bio: Geir E. Dullerud is the W. Grafton and Lillian B. Wilkins Professor in Mechanical Engineering at the University of Illinois at Urbana-Champaign. He is the Director of the new Illinois Center for Autonomy. He is also a member of the Coordinated Science Laboratory, where he is a member of the Decision and Control Laboratory; he is an Affiliate Professor of both Computer Science, and Electrical and Computer Engineering. He has held visiting positions in Electrical Engineering KTH, Stockholm (2013), and Aeronautics and Astronautics, Stanford University (2005-2006). Earlier he was on faculty in Applied Mathematics at the University of Waterloo (1996-1998), after being a Research Fellow at the California Institute of Technology (1994-1995), in the Control and Dynamical Systems Department. He holds a PhD in Engineering from Cambridge University. His areas of current research interest include autonomy and cooperative robotics, convex optimization and learning in control, cyber-physical system security, and hybrid dynamical systems. In 1999 he received the CAREER Award from the National Science Foundation, and in 2005 the Xerox Faculty Research Award at UIUC. He is a Fellow of both IEEE (2008) and ASME (2011). He is currently on the editorial boards of the SIAM Journal of Control and Optimization (SICON), and the Journal of Optimization Theory and Applications (JOTA); he was the General Chair of the recent IFAC workshop Distributed Estimation and Control in Networked Systems (NECSYS 2019) held in Chicago.

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2.2. IFAC Activity Fund

Contributed by: Paul Goulart, paul.goulart@eng.ox.ac.uk

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

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

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3 Books

3.1. Optimal Impulsive Control for Cancer Therapy

Contributed by: J. M. Lemos, jlml@inesc-id.pt

J. P. Belfo and J. M. Lemos, Optimal Impulsive control for cancer therapy, Springer, 2021.
https://www.springer.com/gp/book/9783030504878

Designing therapies for patients on the basis of control engineering principles has several advantages. This approach is specially relevant in the case of illnesses, like HIV-1 infection, or cancer, or treatments with heparins, where the drugs administered have a therapeutical as well as a noxious effect. In these cases, control engineering methods provide a systematic mean to optimize the therapy, selecting a time profile of drug dosing that finds the best compromise, according to an objective criterion, between therapeutic and toxic effects. Although biomedical engineering is still far from providing fully automatic "robotic medical doctors", major progresses in computational and sensing technologies, as well as in modelling of biomedical systems, strongly motivate studies in optimal control applied to therapy.

In this respect, one difficulty consists in the fact that most therapies are not applied in a continuous way, but instead correspond to intensive actions of very short duration, such as the ingestion of pills, that are best modeled by a manipulated variable function that corresponds to a train of impulses with varying amplitude. To tackle this issue, most research works consider as manipulated variable the drug effect, which is a continuous function. Although this approach has the advantage of simplifying the class of optimal control problems considered, it has the serious drawback of neglecting the important part of drug pharmacokinetics in the physiological model and is less realistic. Instead, the present monograph addresses the design and computation of impulsive control therapies.

Although the text is centered on cancer therapy, most of the ideas presented are common to other diseases, to which they may be applied. Chapters 2 and 3 introduce the models that describe the relationship between a certain therapy plan and the evolution of the cancer. Chapter 4 addresses the impulsive optimization problem, including the use of different control techniques. In the last chapter, the main points of the monograph are highlighted and a number of future research topics are suggested.

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3.2. Robust Event-Triggered Control of Nonlinear Systems

Contributed by: Tengfei Liu , tfliu@mail.neu.edu.cn

Robust Event-Triggered Control of Nonlinear Systems (foreword by Professor M. Krstic)
by Tengfei Liu, Pengpeng Zhang, Zhong-Ping Jiang
Springer, 1st ed. 2020, XX, 253 p. 98 illus., 73 illus. in color.
https://www.springer.com/gp/book/9789811550126
DOI: https://doi.org/10.1007/978-981-15-5013-3
ISBN: 978-981-15-5013-3

Description: This book presents a study on the novel concept of "robust event-triggered control of nonlinear systems", discussing the theory and practical applications.

The book contains three parts. Part I reviews the stability notions (including Lyapunov stability and input-to-state stability) and the nonlinear small-gain tools that are used in the book. Part II introduces static and dynamic event triggers for robust event-triggered control of nonlinear systems subject to dynamic uncertainties and external disturbances. The closed-loop event-triggered systems are considered as interconnected systems, and the notion of input-to-state stability and the nonlinear small-gain theorem are employed to characterize the interaction between the controllers and the event triggers, and to guarantee the closed-loop stability. Part III proposes new solutions to the event-triggered control problem for two benchmark examples: lower-triangular nonlinear systems and nonholonomic chained systems. It is particularly shown how the controllers and the event triggers are co-designed to address the nonlinear uncertain dynamics. Both numerical and experimental experiments are employed to validate the effectiveness of the proposed methodology. Richly illustrated, the book would be a valuable resource for researchers, engineers and graduate students in automation engineering who wish to learn the theories, technologies, and applications of event-triggered control of nonlinear systems.

Key Features:
• Presents robust, event-triggered control of nonlinear systems, including the theories, technologies and applications
• Includes the design of event-triggered control algorithms for nonlinear systems subject to disturbances and dynamic uncertainties
• Introduces the novel research idea of event-triggered control of nonlinear systems subject to disturbances

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3.3. Optimal Impulsive Control for Cancer Therapy

Contributed by: João P. Belfo and João M. Lemos, joao.belfo@tecnico.ulisboa.pt

Optimal Impulsive Control for Cancer Therapy
Authors: Belfo, João P., Lemos, João Miranda
Print ISBN: 978-3-030-50487-8
Online ISBN: 978-3-030-50488-5
June 2020, SpringerBriefs in Electrical and Computer Engineering. Springer, Cham.
Softcover, 108 pages. Printed book €51,99, ebook €42,79.

https://doi.org/10.1007/978-3-030-50488-5
https://www.springer.com/gp/book/9783030504878

This book discusses the use of control engineering methods to plan a cancer therapy which tends to reduce tumour size in patients, striking a balance that minimizes the toxic effects of the treatment. The authors address the design and computation of impulsive control therapies, a methodology previously underexplored in the application of control methods to medical modelling. This allows simulation of such discrete events as taking a pill rather than relying on the supply of therapy being continuous and steady.

The book, composed by 7 chapters, begins with an introduction to the topic, before moving onto pharmacokinetic, pharmacodynamical and tumour-growth models and explaining how they describe the relationship between a certain therapy plan and the evolution of cancer. This is placed firmly in the context of work introducing impulsive differential equations, in chapter 4. The final chapter summarizes the research presented and suggests future areas of research to encourage readers in taking the subject forward.

This book is of interest to biomedical engineers, researchers and students, particularly those with a background in systems and control engineering.

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3.4. Backstepping Control of Nonlinear Dynamical Systems

Contributed by: Sonnini Yura, s.yura@elsevier.com

Backstepping Control of Nonlinear Dynamical Systems edited by Sundarapandian Vaidyanathan, Ahmad Azar
Paperback ISBN: 9780128175828
eBook ISBN: 9780128175835
Imprint: Academic Press
Published Date: 19th August 2020
Page Count: 532
Series: Advances in Nonlinear Dynamics and Chaos
https://www.elsevier.com/books/backstepping-control-of-nonlinear-dynamical-systems/vaidyanathan/978-0-12-817582-8

Description: Backstepping Control of Nonlinear Dynamical Systems addresses both the fundamentals of backstepping control and advances in the field. The latest techniques explored include 'active backstepping

control', 'adaptive backstepping control', 'fuzzy backstepping control' and 'adaptive fuzzy backstepping control'. The reference book provides numerous simulations using MATLAB and circuit design. These illustrate the main results of theory and applications of backstepping control of nonlinear control systems. Backstepping control encompasses varied aspects of mechanical engineering and has many different applications within the field. For example, the book covers aspects related to robot manipulators, aircraft flight control systems, power systems, mechanical systems, biological systems and chaotic systems.

This multifaceted view of subject areas means that this useful reference resource will be ideal for a large cross section of the mechanical engineering community.

Key features:
- Details the real-world applications of backstepping control
- Gives an up-to-date insight into the theory, uses and application of backstepping control
- Bridges the gaps for different fields of engineering, including mechanical engineering, aeronautical engineering, electrical engineering, communications engineering, robotics and biomedical instrumentation

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20. Single-Link Flexible Joint Manipulator Control Using Backstepping Technique
21. Backstepping control and synchronization techniques for time delayed chaotic and hyperchaotic systems
22. Multi-switching synchronization of Nonlinear Hyperchaotic Systems via Backstepping Control
23. Backstepping-based chaos control and synchronization in fractional order Bhalekar-Gejji chaotic system
24. A new 5-D chaotic hyperjerk system with two saddle-foci equilibrium Points, its active backstepping control and circuit realization
25. Design and implementation of a backstepping controller for non-holonomic two-wheeled inverted pendulum mobile robots

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3.5. Dynamics and Advanced Motion Control of Off-Road UGVs

Contributed by: Sonnini Yura, s.yura@elsevier.com

Dynamics and Advanced Motion Control of Off-Road UGVs by Yue Ma
Paperback ISBN: 9780128187999
eBook ISBN: 9780128188002
Imprint: Academic Press
Published Date: 6th August 2020
Page Count: 354
Series: Emerging Methodologies and Applications in Modelling, Identification and Control
https://www.elsevier.com/books/dynamics-and-advanced-motion-control-of-off-road-ugvs/ma/978-0-12-818799-9

Description: Dynamics and Advanced Motion Control of Unmanned Ground Off-Road Vehicles details both theoretical concepts such as planning and perception when working with UGVs, as well as more practical, hands-on aspects such as torque vectoring control. The book also covers related technologies such as intelligent and electrification of ground vehicles. After an introduction, initial chapters include an exploration of wheel-soil and track-soil interaction mechanisms, motion stability, motion control, fault detection and identification, and fault tolerance control. This book offers readers a detailed understanding of Unmanned Ground Vehicles by combining theory, applications and further developments.

Topics are covered in such a way that readers will be well versed on the current field of UGVs and will be able to implement future design and research in a feasible and effective way.

Key Features:
- Gives a comprehensive analysis and introduction to the dynamics and advanced motion control of unmanned ground off-road vehicles
- Covers key related technology concepts, such as intelligent and electrification of ground vehicles
- Details the entire control framework of off-road UGVs and the implementation of controller design

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2. Modeling of track soil interaction for tracked unmanned ground vehicle
3. Dynamics of tracked UGVs in three-dimensional space
4. Modeling of driving modules of unmanned ground vehicle
5. Modeling of wheel soil interaction and dynamics of wheeled unmanned ground vehicle in three-dimensional space

Part 2 - Advanced motion control of UGV

6. Motion stability performance concepts
7. State and load observer of unmanned ground vehicle
8. Motion stability enhanced controller design
9. Power management technology
10. Torque vectoring technology

Part 3 - Fault tolerance control of off-road UGV

11. Fault detection and identification of unmanned ground vehicle
12. Fault-tolerance control of unmanned ground vehicle under off-road situation
13. Conclusions and prospects

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4 Journals

4.1. Control Theory and Technology

Contributed by: Zou Tiefeng, tfzou@scut.edu.cn

Control Theory and Technology
(formerly entitled Journal of Control Theory and Applications)
Vol. 18, No. 3, August 2020
ISSN: 2095-6983 CODEN: CTTOAM
https://www.springer.com/journal/11768

Papers:

- A review on charging behavior of electric vehicles: data, model, and control Q. S. Jia, T. Long P.217
- H-infinity position transfer and regulation for floating offshore wind turbines E. Escobar, R. Nagamune P.231
- Application of dynamic sensor activation on operating automated headlights H. Ding, Y. Qian, C. Gong, Y. Hou, W. Wang P.246
- Air quality short-term control in an industrial region under adverse weather conditions Y. Skiba, D. Parra-Guevara P.257
- Multi-agent system motion planning under temporal logic specifications and control barrier function X. Huang, L. Li, J. Chen P.269
- Adaptive high-order sliding mode control based on quasi-time delay estimation for uncertain robot manipulator B. Brahmi, M. Driscoll, M. H. Laraki, A. Brahmi P.279
- Robustness analysis and distributed control of a networked system with time-varying delays Z. Wang, T. Zhou P.293
- Regional averaged controllability for hyperbolic parameter dependent systems M. Abdelli, A. Hafdallah, F. Merghadi, M. Louafi P.307
- Learning implicit information in Bayesian games with knowledge transfer G. Chen, K. Cao, Y. Hong P.315
- Distributed best response dynamics for Nash equilibrium seeking in potential games S. Huang, P. Yi P.324

Letter:

- New directions in distributed Nash equilibrium seeking based on monotone operator theory P. Yi, T. Wang P.333

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4.2. IET Control Theory & Applications

Contributed by: Faraz Alam, farazalam@theiet.org

IET Control Theory & Applications
Volume 14, Issue 13
https://digital-library.theiet.org/content/journals/iet-cta/14/13

Papers:

- Jun Hu; Yu Yang; Hongjian Liu; Dongyan Chen; Junhua Du, Non-fragile set-membership estimation for sensor-saturated memristive neural networks via weighted try-once-discard protocol
- Khalid Abidi; Hang Jian Soo; Ian Postlethwaite, Discrete-time adaptive control of uncertain sampled-data systems with uncertain input delay: a reduction
- Aihua Hu; Ju H. Park; Jinde Cao, Node-to-node bipartite consensus of multi-agent systems with disturbances
- Carlos Rodríguez; Ernesto Aranda-Escolástico; José Luis Guzmán; Manuel Berenguel; Tore Hägglund, Revisiting the simplified IMC tuning rules for low-order controllers: Novel 2DoF feedback controller
- Jinghui Suo; Zidong Wang; Bo Shen; Fuad E. Alsaadi, Event-triggered stabilisation for switched delayed differential systems: the input-to-state stability
- Ladan Khoshnevisan; Xinzhi Liu; Farzad R. Salmasi, Predictive sliding-mode congestion control for wireless access networks with singular and non-singular control gain
- Xiaoxing Ren; Dewei Li; Yugeng Xi; Haibin Shao, Distributed multi-agent optimisation via coordination with second-order nearest neighbours
- Zhenyu Gao and Ge Guo, Command filtered finite-time formation tracking control of AUVs with unknown control directions
- Nacim Meslem and Ahmad Hably, Robust set-membership state estimator against outliers in data
Jun-Wei Hu; Xi-Sheng Zhan; Jie Wu; Huai-Cheng Yan, Analysis of optimal performance of MIMO networked control systems with encoding and packet dropout constraints
- Chaofang Hu; Xiaofang Wei; Lei Cao; Ye Tao; Zhifei Gao; Yongtai Hu, Integrated fault-tolerant control system design based on continuous model predictive control for longitudinal manoeuvre of hypersonic vehicle with actuator faults
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4.3. IEEE/CAA Journal of Automatica Sinica

Contributed by: Yan Ou, yan.ou@ia.ac.cn

IEEE/CAA Journal of Automatica Sinica
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4.4. International Journal of Control, Automation, and Systems

Contributed by: Keum-Shik Hong, journal@ijcas.com

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

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

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

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4.12. Journal of the Franklin Institute

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

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4.13. European Journal of Control

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

European Journal of Control
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4.14. CFP: Control Engineering Practice

Contributed by: Johannes Schiffer, schiffer@b-tu.de

Call For Papers: Control Engineering Practice - Special Issue on Smart Technologies for Net-zero Emissions Energy Systems

The future global economy will be greatly shaped by the transformed energy landscape and a net-zero transition in energy-intensive processes and systems. While significant progress has already been made towards renewable and clean electric power generation and electrification of heating and on-road light vehicles, an increasing number of additional sectors are facing major challenges in electrification and decarbonisation. These include e.g., high-energy manufacturing and heavy-duty transportation. At the same time, large uncertainties and variabilities in both energy supply and energy demand are becoming a norm, with climate change and unexpected natural and public health disasters and risks further aggravating the existing challenges. These developments call for both technological innovations in different sectors and the coordinated integration of the whole energy chain from top to tail. As an enabling technology, control engineering can play a paramount role in successfully establishing the forthcoming green energy era by accelerating sectoral decarbonisation and creating synergy effects across decarbonisation pathways for different systems.

This special issue aims to showcase the latest developments of smart technologies in modelling, control and optimization of hybrid energy systems across different sectors, with a focus on their synergy to deliver the net-zero emission target. Practical contributions towards control engineering and applications are invited on topics that include, but are not limited to:
• Advanced modelling, scheduling, operation and control techniques for
• accelerating the use of renewable energy in manufacturing;
• supporting renewable power integration with on-road transport electrification infrastructure;
• electrification and energy storage in maritime shipping;
• integration of renewable power generation and energy storage with railway electrification;
• Interpretable artificial intelligence and immersive virtual reality to improve the resilience and responsiveness of manufacturing processes for a net zero transition;
• New sensing and IoT techniques for integration of smart energy systems with intelligent manufacturing;
• Planning, operation and control of district heating and cooling combined with renewable energy sources;
• Power electronic control in renewable power generation and their integration with transport electrification;
• Case studies and emerging industrial applications to promote net-zero transitions.

We encourage submissions containing experimental results. In the absence of experiments, practical simulation examples would be required.
Control Engineering Practice is a premier journal that publishes papers with direct applications of profound control theory and its supporting tools in all possible areas of automation. Through this special issue, we hope to attract more academic researchers and industrial practitioners to work and shape this new, fasci-

nating and vital area.

Target Timeline: Submission 31 December 2020; Acceptance 31 May 2021
For further information, please see https://www.journals.elsevier.com/control-engineering-practice/call-for-papers/special-issue-on-smart-technologies

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4.15. CFP: Asian Journal of Control

Contributed by: Li-Chen Fu, lichen@ntu.edu.tw

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

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

The objective of this Special Issue is to present emerging control techniques for mechatronic and transportation systems that can be successfully applied to numerous engineering applications (e.g., control of rolling mills, conveyor belts, unicycles, bicycles, cars, trains, ships, airplanes, drones, missiles, satellites, platoons, manufacturing robots, such as welding, painting, assembly, pick and place for printed circuit boards, packaging and labeling, palletizing, product inspection, and testing ones, and surgical robots). The topics include but are not limited to:
– Unmanned systems
– Industrial robots
– Remote servomechanisms
– Transportation systems
– Vehicle platoons
– Networked autonomous agents
– Smart sensors and actuators
– Human-machine interaction and human-machine cooperation
– IoT control design

– From research to industry

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

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

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

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

analysis and synthesis of complex cyber-physical networks, regarding both fundamental theory and practical applications.

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

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Important Dates:
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May 31, 2021 Completion of Final Review
August 31, 2021 Receipt of Final Manuscript
January 31, 2021 (Tentatively Vol. 24, No. 1) Publication

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4.16. CFP: Entropy & Information Theory in Privacy of Cyber-Physical Systems

Contributed by: Farhad Farokhi, ffarokhi@unimelb.edu.au

CFP: Special Issue, Entropy, Information Theory in Privacy and Security of Cyber-Physical Systems

Title: Information Theory in Privacy and Security of Cyber-Physical Systems Special Issue Information: This Special Issue will focus on exploring the intersection of privacy and security with information, control, and estimation theory with applications to cyber-physical systems, such as smart grid and intelligent transport systems. Previously unpublished contributions in security and privacy methods for machine learning, Internet of Things (IoT), database systems, dynamical systems, smart grid, and transport systems based on information-theoretic methods are solicited, including but not limited to the following:

- Differential privacy and privacy-preserving mechanisms
- Private information retrieval
- Noiseless or non-stochastic privacy
- Secure multi-party computation
- Private computation
- Security and privacy in distributed and federated learning
- Security and privacy in smart grid
- Security and privacy in transport systems
- Information-theoretic tools for investigating privacy in dynamical systems
- Security of cyber-physical systems
- Secrecy capacity
- Attack models and information-theoretic defense mechanisms
- Covert and stealthy communication
- Coding for security and privacy

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Link: https://www.mdpi.com/si/57636

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4.17. CFP: Nonlinear Analysis: Hybrid Systems

Contributed by: Kai Cai, kai.cai@eng.osaka-cu.ac.jp

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

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- Majid Zamani, University of Colorado Boulder (Majid.Zamani@colorado.edu)

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

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

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

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

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

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5 Conferences and Workshops

5.1. World Congress: Math Problems in Engineering & Aerospace, Czech Republic

Contributed by: Seenith Sivasundaram, seenithi@gmail.com

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

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

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

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

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5.2. Conference on Learning for Dynamics and Control 2021, Switzerland

Contributed by: Melanie Zeilinger, mzeilinger@ethz.ch

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

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

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

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

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

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

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

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

• Physical learning in dynamical and control systems applications in robotics, autonomy, transportation systems, cognitive systems, cognitive systems, neuroscience, etc.

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

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5.3. CDC 2020 Virtual Program, South Korea

Contributed by: Hideaki Ishii, ishii@c.titech.ac.jp

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

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

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

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

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

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

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

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

O1. Control, Optimization, and Learning Methods for Emerging Mobility Systems

O2. Compressed Sensing and Sparse Representation for Systems and Control
O3. Learning and Security for Multi-Agent Systems

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

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

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

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

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6 Positions

6.1. PhD: Eindhoven University of Technology, The Netherlands

Contributed by: Mircea Lazar, m.lazar@tue.nl

PhD: Eindhoven University of Technology, The Netherlands

Topic: Predictive control of medium voltage fast chargers for electrical vehicles

This project focuses on advanced control of medium voltage fast chargers for electrical vehicles in order to minimize charging times and reduce the strain on the electricity grid. This involves research in model predictive control, self-learning control, optimization, and on the application side, control of grid-connected power converters and power systems stability. The research is part of the NEON (New energy outlook for the Netherlands) NWO (Dutch Research Council) project and it will be conducted within the Control Systems (CS) group of the Department of Electrical Engineering, TU/e, in cooperation with the Electromechanics and Power Electronics (EPE) and Electrical Energy Systems (EES) groups, Damen, Prodrive and the other NEON partners.

NEON is a multidisciplinary project that address three related societal challenges: clean energy, intelligent green transport, and climate action. It aims at developing solutions for quickly transforming our energy and mobility systems from running on fossil fuels to running on renewable energy. NEON will make use of a cross-disciplinary and integral approach to address complex aspects of the energy transition: the interaction between energy and mobility, the relation between technology innovation and personal preferences, the regulation and standardization of future energy and mobility systems, etc. This will involve the collaboration of several academic and industrial partners from the Netherlands across multiple science domains.

More details can be found at
https://jobs.tue.nl/en/vacancies.html (vacancy reference number V36.4582).

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6.2. PhD: University of Adelaide, Australia

Contributed by: Ali Pourmousavi Kani, a.pourm@adelaide.edu.au

Three Industry PhD positions available at the University of Adelaide, Australia

We have 3 industry PhD positions available at the Electrical and Electronic Engineering school, The University of Adelaide, Australia, in partnership with SEAS-NVE, Denmark.

UAiPhD is an innovative 4-year program, which includes completion of mandatory 6-month industry placement. We offer
- $10K p.a. top-up scholarship (total of $38K p.a. tax-free stipend) plus $5K research allowance p.a.
- $9K extra stipend during industry placement and one two-way economy airfare to Denmark

You will be primarily based in the beautiful North Terrace Campus at the heart of Adelaide city during your PhD. Candidates will be a part of a multi-disciplinary project called “Flexibility Aggregator Simula-

tion Platform (FRESNO)" at the intersection of the power system (electricity market), machine learning, statistical modelling and inference, optimisation and game theory. Candidates with a degree (preferably a master's degree) in electrical engineering, computer science, operations research, and applied mathematics (with preferably research experience in power/energy system and electricity market) are encouraged to apply. For projects description, eligibility and application submission, please visit https://bit.ly/2PT2e4B

NOTE: Applications are open to both international and domestic student onshore in Australia. If you are applying from outside of Australia, however, please contact me directly (a.pourm@adelaide.edu.au) to discuss the project further.

Application deadline: 31 August 2020
PhD start date: January 2021 or earlier

About the School of Electrical and Electronic Engineering: The University of Adelaide continuously ranks among the world's top 1% of universities (between 100 to 150 in different ranking systems) and the University has the highest volume of commercial research agreements of all Australian universities. As a school, we are consistently ranked well above world standards (highest rating) in Australia's national research evaluation framework by the Australian Research Council. In 2020 ARWU rankings, the school is ranked 42nd in the world and top in Australia in the subject area of Electrical & Electronic Engineering. In particular, the electric power system research group has made a reputation of excellence over the years in Australia and internationally, and collaborate with various industry and government organisations.

About the City of Adelaide: The city is ranked among the top 10 most liveable city in the world by the Economist magazine and the most affordable major city in Australia. Adelaide is known as the festival city because of its many festivals and sporting events. Adelaide Fringe is the world's second-largest annual arts festival. Also, the city is famous for its food and wine industry and amazing sceneries all around the year.

Dr Ali Pourmousavi Kani, Lecturer
School of Electrical and Electronic Engineering, University of Adelaide, Australia
W: https://researchers.adelaide.edu.au/profile/a.pourm

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6.3. PhD: University of North Carolina at Charlotte, USA

Contributed by: Artur Wolek, awolek@uncc.edu

Ph.D. Position in Robotics/Control at UNC Charlotte

A Ph.D. position is available starting Spring 2021 in the Mechanical Engineering and Engineering Science Department at the University of North Carolina at Charlotte. The selected student will join Dr. Artur Wolek's research group (https://coefs.uncc.edu/awolek/) to work in the area of collaborative sensing with heterogeneous mobile robots. This opportunity will provide exposure and training in several areas relevant to robotics, including: vehicle dynamics, estimation, control, network science, optimization, and planning. The student will also gain practical experience developing and deploying autonomous aerial or marine robots in outdoor environments. Dr. Artur Wolek is an enthusiastic Assistant Professor who aims to provide his graduate students with an exciting and rewarding research experience.

If you are interested, please contact Dr. Wolek at awolek@uncc.edu with an up-to-date copy of your CV. More information on this opportunity is available here: https://tinyurl.com/y59drpt4

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6.4. PhD: Politecnico di Torino, Italy

Contributed by: Fabrizio Dabbene, fabrizio.dabbene@ieiit.cnr.it

Marie Curie PhD Fellowship, Politecnico di Torino and Institute of Electronics, Computer and Telecommunication Engineering (IEIIT-CNR)

I have a PhD position for Fall 2020 - Spring 2021 within the BANYAN EID project funded by HORIZON 2020/ Marie Skłodowska-Curie Action, in the field of data analytics and machine learning approaches for the deployment and proactive optimization of 5G and multi-RAT networks.

The recruited Early Stage Researcher (ESR) will be enrolled in "PhD in Electrical, Electronics and Communications Engineering" of PoliTo (http://dottorato.polito.it/en/doctoral_school). They will participate in an exciting multidisciplinary research programme that will enhance their career perspectives in both the academic and non-academic sector. In addition to their individual projects, the recruited ESRs will benefit from a dedicated training programme consisting of local and network wide training activities aimed at improving their scientific knowledge and transferable skills.

The selected ESR will work on the spatial-temporal characterization of patterns of users' demands for individual mobile services at macroscopic (citywide) scales, and he will experience an intersectoral training programme encompassing 18-month internship in a company (Ranplan Wireless Network Design Ltd.an, Cambridge UK and Orange, FR), and 18 months in academic institute (CNR and PoliTo).

Interested applicants should have most of the following qualifications:
- a master's or undergraduate degree in engineering, applied mathematics, or related fields;
- strong background in optimization, linear systems theory, and machine learning (basic)
- a solid set of GPA, TOEFL, and GRE scores.

Interested candidates can send me their transcripts and brief resume at fabrizio.dabbene@ieiit.cnr.it alongside any previously published papers, and copies of GRE/TOEFL scores. Emails should indicate that you have seen this ad in this E-Letter.

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6.5. PhD: Rutgers University, USA

Contributed by: Xiaoli Bai, xiaoli.bai@rutgers.edu

Graduate assistant positions available at Rutgers

Graduate assistant positions are available at Rutgers, The State University of New Jersey. The students will be supervised by Dr. Xiaoli Bai (http://x-bai.rutgers.edu/). Qualified candidates with degrees in aerospace

engineering, electrical engineering, applied mathematics, automation, or closely related fields are encouraged to apply.

Preference will be given to students who have good background and strong interest in astrodynamics and/or aircraft dynamics and control, are self-motivated to do first-class research, with the following skills:
- Designing and flying experiments with UAVs
- Hands-on experience with sensors such as cameras and IMU
- Hands-on experience with software such as ROS and Pixhawk
- Modeling and simulation
- Learning from data/machine learning

Followings are some example projects:
https://go.nasa.gov/3gjxPaw
http://x-bai.rutgers.edu/project/onr-carrier-landing/

You are encouraged to talk to Professor Bai through xiaoli.bai@rutgers.edu if you are interested. Please include your transcripts and CV in the first communication.

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6.6. PhD: Eindhoven University of Technology, The Netherlands

Contributed by: Nathan van de Wouw, N.v.d.Wouw@tue.nl

The TU/e offers a Ph.D. position with the DIGITAL TWIN research program. This NWO AES Perspectief programme is a five-year comprehensive research programme on the development of digital twinning methods, financed by the Dutch Research Council (NWO) within the domain of Applied and Engineering Sciences (AES). This collaborative programme involves six universities: University of Groningen, Eindhoven University of Technology, TU Delft, University of Twente, Leiden University and Tilburg University and ten industrial partners and two research institutes.

Project Description: The development of reliable and agile digital twins of high-tech systems and materials is key to enabling shorter time-to-market, zero-defect and flexible manufacturing systems with accurate predictive maintenance. This crucial development is currently hampered by the lack of synergy between model-based engineering and data-driven/artificial intelligence approaches. The DIGITAL TWIN program will develop key-enabling technologies for full digitization of the value chain of high-tech systems and materials by the integration of data-driven learning approaches and model-based engineering methods.

One of the projects (involving three Ph.D. projects) within the DIGITAL TWIN program focusses on Technology Health Management. In this scope, the open Ph.D. position at TU/e is on:
Hybrid model-data approach for machine level anomaly detection and isolation.

The reliable functioning of high-tech systems relies on the predictive maintenance technologies. In support of predictive maintenance, techniques for fault detection (is a fault occurring?) and fault isolation (what is source of the fault?) are key prerequisites. Therefore, this project aims to develop novel techniques for detection and isolation of anomalies in high-tech system behaviour. Existing approaches typically either take 1) a model-based approach in which model behaviours of a healthy system are compared to measured data

to detect the fault or 2) a purely data-based approach, in which correlation between system degradation and measured performance data is based on past data. Neither is suitable to guarantee accurate anomaly detection for complex systems operating in uncertain and changing environments.

This project envisions to develop a hybrid approach combining the strengths of both models and data. The strength of the model ingredient is that physics-based insight is firmly embedded in the detection strategy warranting the validity of the approach, also in scenarios in which system parameters may change. The strength of using data is twofold: 1) using learning techniques employing measured machine data, the healthy model parameters can be tuned online and/or 2) the design of the detection mechanisms can be tuned online based on data to secure reliable detection.

Within this Ph.D. project a collaboration with the high-tech companies ASML (developing lithography machines), Canon Production Printing (developing industrial printers) and VDL-ETG (developing, a.o., robotic equipment) will be fostered. The starting date is flexible but ideally would be in December 2020.

Requirements:
The Ph.D. candidate should have
• an M.Sc. degree in Mechanical Engineering, Electrical Engineering or Systems and Control with a solid background in dynamical systems and control.
• a strong interest and skills in both 1) developing new fundamental theories for fault detection and isolation and 2) applying such novel scientific developments to industrial high-tech applications.
• Excellent communication skills and written/verbal knowledge of the English language.

Interviews with the selected PhD-candidates will take place on-site at TU/e in the Netherlands (if restrictions associated to the Covid-19 situation permit).

Application: Online application via the 'Apply now' button at
https://jobs.tue.nl/en/vacancy/phd-hybrid-modeldata-approach-for-machine-level-anomaly-detection-isolation-859882.html

Please provide the following information:
• an extended curriculum vitae,
• an explanation of your interest in the proposed research topic,
• your course program and corresponding grades,
• references,
• all other information that might help us to assess your suitability for one of these positions, and
• a publication list (if applicable).

Information: For more information on the vacancy, consult the website
https://jobs.tue.nl/en/vacancy/phd-hybrid-modeldata-approach-for-machine-level-anomaly-detection-isolation-859882.html
or contact Prof.dr. Nathan van de Wouw, N.v.d.Wouw@tue.nl

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6.7. PhD: Eindhoven University of Technology, The Netherlands

Contributed by: Nathan van de Wouw, N.v.d.Wouw@tue.nl

The TU/e offers a Ph.D. position with the DIGITAL TWIN research program. This NWO AES Perspectief programme is a five-year comprehensive research programme on the development of digital twinning methods, financed by the Dutch Research Council (NWO) within the domain of Applied and Engineering Sciences (AES). This collaborative programme involves six universities: University of Groningen, Eindhoven University of Technology, TU Delft, University of Twente, Leiden University and Tilburg University and ten industrial partners and two research institutes.

Project Description: The development of reliable and agile digital twins of high-tech systems and materials is key to enabling shorter time-to-market, zero-defect and flexible manufacturing systems with accurate predictive maintenance. This crucial development is currently hampered by the lack of synergy between model-based engineering and data-driven/artificial intelligence approaches. The DIGITAL TWIN program will develop key-enabling technologies for full digitization of the value chain of high-tech systems and materials by the integration of data-driven learning approaches and model-based engineering methods.

One of the projects (involving three Ph.D. projects) within the DIGITAL TWIN program focuses on Autonomous Process & Control Reconfiguration and Optimization. In this scope, the open Ph.D. position at TU/e is on
Automated data-based performance optimization of control systems.

Control strategies for complex high-tech systems (such as precise positioning, thermal management, vibration isolation) are typically designed based on models of the underlying dynamics and/or based on measurement of these dynamics before delivery of the equipment to the customer. However, these designs are typically far from optimal under real-life conditions of machine use such as hard-to-predict and changing disturbance situations, ageing/degradation of machine parts, evolving type of machine usage, and flexible customer specifications.

Therefore, the goal of this Ph.D. project is to develop a data-based performance optimization strategy to make control systems agile under changing circumstances. We envision to develop novel extremum seeking control methods that guarantee optimal performance in terms of time-varying system behavior, while dealing with changing circumstances of use, hard constraints related to hardware and customer specifications, and nonlinear system behavior. Another goal of such data-based strategy may be to achieve uniform performance over an entire machine park. These objectives are envisioned to be achieved by exploiting only measured performance and constraint data and limited prior system knowledge. The fact that such an approach allows for large model uncertainties, being in essence a model-free approach, makes such approach also particularly suitable for complex, multi-physics problems in high-tech systems. As such, it can be used to make system-wide, multi-disciplinary design trade-offs in an online fashion.

Within this Ph.D. project a collaboration with the high-tech semiconductor company ASM PT will be fostered. The starting date is flexible but ideally would be in December 2020.

Requirements:
The Ph.D. candidate should have

• an M.Sc. degree in Mechanical Engineering, Electrical Engineering or Systems and Control with a solid background in dynamical systems and control.
• a strong interest and skills in both 1) developing new fundamental theories for data-based control and 2) applying such novel scientific developments to industrial high-tech applications.
• Excellent communication skills and written/verbal knowledge of the English language.

Interviews with the selected PhD-candidates will take place on-site at TU/e in the Netherlands (if restrictions associated to the Covid-19 situation permit).

Application: Online application via the 'Apply now' button at https://jobs.tue.nl/en/vacancy/phd-on-automated-databased-performance-optimization-of-control-systems-859900.html

Please provide the following information:
• an extended curriculum vitae,
• an explanation of your interest in the proposed research topic,
• your course program and corresponding grades,
• references,
• all other information that might help us to assess your suitability for one of these positions, and
• a publication list (if applicable).

Information: For more information on the vacancy, consult the website
https://jobs.tue.nl/en/vacancy/phd-on-automated-databased-performance-optimization-of-control-systems-859900.html
or contact Prof.dr. Nathan van de Wouw, N.v.d.Wouw@tue.nl

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6.8. PhD: University of Groningen, The Netherlands

Contributed by: Bart Besselink, b.besselink@rug.nl

PhD position on Specification Management for Control System Design

In this PhD project, we will develop a framework for expressing complex control specifications using so-called assume-guarantee contracts. These contracts are inspired by results from computer science and have the potential to express a rich class of control specifications. They will be supported with tools for compositional analysis, allowing for deriving specifications on interconnected systems on the basis of specifications on its components. In addition, tools for data-based verification of component specifications will be developed.

This PhD project is part of the Dutch NWO AES Perspectief programme on DIGITAL TWIN.

The research project will be conducted within the research unit Systems, Control and Applied Analysis (SCAA) of the Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence, University of Groningen.

More details about this position (and information on how to apply) can be found at https://bit.ly/3b0uJac.

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6.9. PhD: TU Delft, The Netherlands

Contributed by: Sergio Grammatico, s.grammatico@tudelft.nl

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

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

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

General project abstract: https://bit.ly/3hVXYhn

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

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

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

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6.10. Postdoc: TU Delft, The Netherlands

Contributed by: Sergio Grammatico, s.grammatico@tudelft.nl

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

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

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

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

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

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

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6.11. Postdoc: Loughborough University, UK

Contributed by: Cunjia Liu, c.liu5@lboro.ac.uk

Postdocs in goal oriented control and autonomous aerial vehicles

Three postdoc positions are available at Loughborough University Centre for Autonomous Systems. The centre is one of the leading research groups in control engineering and autonomous vehicles in the UK and is well funded with several national and international research projects.
The positions range from theoretical research on goal-oriented control to applicational research on autonomous aerial vehicles in complex environments and for crop protection. The length of the contract

varies from 18 months to 36 months.

The positions will involve research activities in the following but not limited areas:
• Advanced control theory, including MPC, hierarchical control, discrete-event control, supervisory control, and temporal logic control.
• Optimisation and decision marking
• Abstraction and formal method
• Bayesian estimation and information fusion
• Autonomous vehicle (including UAV) control and path planning
• Localisation and navigation in GPS denied environments

The successful candidates will join the group working with other researchers to foster a collaborative research environment, including involvement in relevant research projects and interaction with PhD students. There is also sufficient funding for training, travel, and equipment associated with the projects.
Should you need more information, please do not hesitate to contact Professor Wen-Hua Chen, w.chen@lboro.ac.uk or Dr Cunjia Liu, c.liu5@lboro.ac.uk.

More information and formal application process can be found in the following links:
• Research Associate in Goal-Oriented Control Systems
https://www.jobs.ac.uk/job/CBI219/research-associate-in-goal-oriented-control-systems
• Research Associate in Autonomous CBR Response in Complex Environments using Intelligent Vehicles
https://www.jobs.ac.uk/job/CBI045/ra-in-autonomous-cbr-response-in-complex-environments-using-intelligent-vehicles
• Research Associate in Unmanned Aerial Vehicles for Crop Protection
https://www.jobs.ac.uk/job/CBI022/research-associate-in-unmanned-aerial-vehicles-for-crop-protection

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6.12. Faculty: EPFL, Switzerland

Contributed by: Colin Jones, colin.jones@epfl.ch

Faculty Position in Control for Intelligent Systems at the EPFL

The Institute of Mechanical Engineering in the School of Engineering invites applications for a faculty position at the level of Tenure-Track Assistant Professor in Control for Intelligent Systems.

We seek top-level applicants with an outstanding research record in the broad area of control for intelligent systems (theory, computation, and practice) to address engineering challenges presented by the availability of large amounts of data, supported by modern networks and computational approaches. Research areas of interest include, but are not limited to: (i) complex interconnected systems, (ii) cyber-physical systems, (iii) safe and reliable control, (iv) pervasive intelligence, (v) autonomous systems and (vi) data-driven control. Since control and automation are key components of the Swiss economy, applicants should demonstrate an affinity for interactions with industrial partners.

As a faculty member of the School of Engineering, the successful candidate will be expected to initiate and develop an independent and creative research program, as well as to participate in undergraduate and graduate teaching. Internationally competitive salaries, start-up resources, and benefits are offered.

Applications should include a cover letter with a statement of motivation, curriculum vitae, list of publications and patents, and concise statements of research and teaching interests. Applicants should also provide the names and addresses of 3 to 5 referees. Applications must be uploaded in PDF format to the recruitment web site:

https://facultyrecruiting.epfl.ch/position/23691274

Formal evaluation of candidates will begin on December 1, 2020.

Enquires may be addressed to:
Prof. Colin Jones
Search Committee Chair
e-mail: igm-search@epfl.ch

For additional information on EPFL, please consult the websites: www.epfl.ch, sti.epfl.ch, igm.epfl.ch. EPFL is an equal opportunity employer and family friendly university. It is committed to increasing the diversity of its faculty. It strongly encourages women to apply.

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6.13. Faculty: University of California - Berkeley, USA

Contributed by: Scott Moura, smoura@berkeley.edu

Cluster Faculty Hire In Climate Equity And Environmental Justice — University Of California, Berkeley

The University of California, Berkeley seeks applicants for four tenure track (assistant professor) positions and one tenured (associate or full professor) position in the area of "Climate Equity and Environmental Justice," with a potential start date of July 1, 2021. Successful candidates will be invited to join one or more of the following units: Rausser College of Natural Resources (Department of Environmental Science, Policy and Management and Energy and Resources Group); College of Letters and Sciences (Sociology); College of Environmental Design (Departments of City and Regional Planning and Landscape Architecture and Planning); and College of Engineering (Department of Civil and Environmental Engineering).

Human-induced climate change is transforming our physical and social world, and we are witnessing a 'climate gap,' in which the impacts of these changes disproportionately affect vulnerable and marginalized groups due to historically entrenched inequities and more recent shifts in the global economy. Accordingly, this faculty cluster hiring initiative focuses on three broad themes: Social Equity and Environmental Sustainability; Adaptation Infrastructure, Planning and Design for Climate Justice; and Climate Refugees and Forced Migration.

Minimum qualification: J.D., Ph.D. (or equivalent international degree), or enrolled in J.D., Ph.D., or equivalent international degree-granting program at the time of application.

Preferred qualifications: Successful applicants are expected to develop a nationally recognized program and collaborate across disciplines to develop research initiatives in the realm of climate equity and environmental justice. We seek rising leaders from diverse fields including, but not limited to, the social, physical, natural, biological and environmental health sciences, civil and environmental engineering, city and regional planning, and landscape architecture. Candidates should demonstrate evidence of strong research productivity, potential for securing extramural funding, and a commitment to excellence in teaching and mentoring of undergraduates, graduate students, and post-docs. We are particularly interested in scholars with a commitment and track record of promoting diversity, equity and inclusion in the realms of research, teaching and/or service (see https://ofew.berkeley.edu/recruitment/contributions-diversity/support-faculty-candidates for helpful guidelines).

For more information about the position, including required qualifications and application materials, go to https://aprecruit.berkeley.edu/JPF02634. The deadline to apply is September 21, 2020 at 11:59pm (Pacific Time). For questions, please contact the search administrator at espm_recruit@berkeley.edu.

UC Berkeley is committed to addressing the family needs of faculty, including dual career couples and single parents. We encourage candidates who have had non-traditional career paths, or who have taken time off for family reasons, to apply for this position. The University of California is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, age, or protected veteran status. For the complete University of California nondiscrimination and affirmative action policy see:

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6.14. Faculty: Delft University of Technology, The Netherlands

Contributed by: Bart De Schutter, b.deschutter@tudelft.nl

The Delft Center for Systems and Control (https://www.dcsc.tudelft.nl) at the Delft University of Technology, The Netherlands seeks to hire an Assistant Professor in the following area: Optimal Control of Thermofluids Networks.
More information on this position and on how to apply can be found at

https://www.tudelft.nl/en/3me/departments/delft-center-for-systems-and-control/about-dcsc/vacancies/

or by contacting Prof.dr.ir. Tamas Keviczky (t.keviczky@tudelft.nl).

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6.15. Faculty: Institute of Science and Technology, Austria

Contributed by:, faculty.recruiting@ist.ac.at

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

The Institute of Science and Technology Austria invites applications for several open positions in all areas of computer science and data science. We especially welcome applications in statistics, machine learning,

optimization, bioinformatics, scientific computing, computer systems, control theory, and robotics.

IST Austria offers:
• A highly international and interdisciplinary research environment with English as working language on campus
• State-of the art facilities and scientific support services (www.ist.ac.at/scientific-service-units/)
• Competitive start-up package and salary
• Guaranteed annual base funding including funding for PhD students and postdocs
• Wide portfolio of career support
• Child-care facilities on campus

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

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

Please apply online at: www.ist.ac.at/jobs/faculty/

The closing date for applications is October 30, 2020. IST Austria values diversity and is committed to equal opportunity. We strive for increasing the number of women, particularly in fields where they are underrepresented, and therefore we strongly encourage female researchers to apply.

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6.16. Faculty: Seoul National University, South Korea

Contributed by: Songhwai Oh, songhwai@snu.ac.kr

Open Rank Professorship in Robotics and Control at Seoul National University, Korea
Tenure-Track Faculty Position in Robotics and Control (ECE, SNU)

The Department of Electrical and Computer Engineering (ECE) at the Seoul National University invites applications for a full-time tenure track faculty position at all ranks, in the areas of Robotics and Automatic Control. The ECE department is seeking a candidate with internationally outstanding research and teaching credentials who can play a major role in research. A candidate must have a Ph.D. degree earned by February 2021. If you would like to be considered for this faculty search, please send your up-to-date CV to Prof. Songhwai Oh (songhwai@snu.ac.kr).

The ECE department at SNU has over 60 faculty members conducting research in wide range of areas including but not limited to, IT/Bio and IT/Nanotechnology, Computer and VLSI, Systems Control, In-

strumentation, and Automation, Electric Energy Systems, Electrophysics and Laser Technology Information, Telecommunications and Radio Sciences, Semiconductor Devices, and Integrated Circuits. Faculty members are engaged in interdisciplinary research through a number of research centers and international collaborative research projects.

Seoul National University (SNU) is the premier university in the Republic of Korea with international stature. SNU is ranked 37th among the world's best universities in the QS World University Rankings 2020. The university comprises 16 colleges, a graduate school of arts and sciences, and six professional graduate schools, altogether enrolling approximately 30,000 students. The full-time faculty of about 2,500 offers 83 undergraduate and 98 graduate programs, including 27 interdisciplinary programs. SNU also houses 143 research centers. Its vibrant main campus is located on the scenic hills of Gwanak Mountain in southern Seoul.

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6.17. Faculty: Seoul National University, South Korea

Contributed by: Songhwai Oh, songhwai@snu.ac.kr

Open Rank Professorship in Robotics and Control at Seoul National University, Korea
Tenure-Track Faculty Position in Robotics and Control (ECE, SNU)

The Department of Electrical and Computer Engineering (ECE) at the Seoul National University invites applications for a full-time tenure track faculty position at all ranks, in the areas of Robotics and Automatic Control. The ECE department is seeking a candidate with internationally outstanding research and teaching credentials who can play a major role in research. A candidate must have a Ph.D. degree earned by February 2021. If you would like to be considered for this faculty search, please send your up-to-date CV to Prof. Songhwai Oh (songhwai@snu.ac.kr) no later than Sept. 23, 2020.

The ECE department at SNU has over 60 faculty members conducting research in wide range of areas including but not limited to, IT/Bio and IT/Nanotechnology, Computer and VLSI, Systems Control, Instrumentation, and Automation, Electric Energy Systems, Electrophysics and Laser Technology Information, Telecommunications and Radio Sciences, Semiconductor Devices, and Integrated Circuits. Faculty members are engaged in interdisciplinary research through a number of research centers and international collaborative research projects.

Seoul National University (SNU) is the premier university in the Republic of Korea with international stature. SNU is ranked 37th among the world's best universities in the QS World University Rankings 2020. The university comprises 16 colleges, a graduate school of arts and sciences, and six professional graduate schools, altogether enrolling approximately 30,000 students. The full-time faculty of about 2,500 offers 83 undergraduate and 98 graduate programs, including 27 interdisciplinary programs. SNU also houses 143 research centers. Its vibrant main campus is located on the scenic hills of Gwanak Mountain in southern Seoul.

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6.18. Faculty: Norwegian University of Science and Technology, Norway

Contributed by: Morten Breivik, morten.breivik@ntnu.no

Three faculty positions at the Norwegian University of Science and Technology

1. Professor/Associate Professor in Human-Machine Interaction for Cyber-Physical Systems

The Norwegian University of Science and Technology (NTNU, http://www.ntnu.edu/) is establishing a new professorship in Human-Machine Interaction for Cyber-Physical Systems, in collaboration with Statnett, the transmission system operator in Norway (https://www.statnett.no/en/). The position will be affiliated with the Department of Engineering Cybernetics (Institutt for teknisk kybernetikk, ITK – http://www.ntnu.edu/itk) at NTNU's Faculty of Information Technology and Electrical Engineering in Trondheim, Norway. ITK has 31 professors, 12 adjunct professors, about 15 postdocs and researchers as well as 80 PhD candidates. Approximately 190 candidates graduate annually from the three MSc programs in cybernetics, which comprise over 800 students in total. The department is involved in numerous research projects and centers, including the Centre of Excellence for Autonomous Marine Operations and Systems (NTNU AMOS, http://www.ntnu.edu/amos). Also, a new Centre on Research-based Innovation for autonomous ships (SFI Autoship) has recently been awarded and will start up in late 2020, with ITK as host department.

The position is within the field of Human-Machine Interaction for Cyber-Physical Systems. In addition to energy/power systems, such systems encompass applications in the offshore, process, maritime, aquaculture, aerospace and medical industries.

For both position categories, the following is required:
• Doctoral degree in a relevant area
• Experience with essential areas of Human-Machine Interaction for Cyber-Physical Systems, such as:
• Human-machine interfaces
• Human factors
• Interaction design
• Decision support
• Big-data analytics and visualization
• Control engineering
• Safety, risk and security
• Mastering Norwegian or another Scandinavian language
• Communicating well in English both orally and in writing
• Statnett operates the main electricity grid in Norway, which is considered to be a critical infrastructure. Statnett is therefore legally bound by safety legislations stated in "Lov om nasjonal sikkerhet" (Sikkerhetsloven). The applicant must therefore qualify for security clearance in Norway

The professor is expected to play a leading role in research and research-based education for Human-Machine Interaction for Cyber-Physical Systems at the department. Specifically, it is important to develop new methods for data-driven and model-based decision support in real time, including both new data-analytics methods for interpretation of generated big data, as well as new human-machine interfaces for effective presentation of relevant information to human decision makers. This will enable new solutions

for human-machine interaction for cyber-physical systems.

The research activities at the department rely mainly on external funding, and the development of educational programs may also receive external funding. The professor is expected to engage extensively in applications for external funding, e.g. from the Research Council of Norway, European research and educational agencies, the industry sector, and other available sources. Statnett will in particular contribute with project funding and collaboration.

MSc and PhD candidates from the cybernetics study programs are expected to be competitive in an international job market. The professor will contribute toward the department's educational profile and promote an excellent learning environment, in collaboration with colleagues, students and external stakeholders. Specifically, the professor is expected to teach a minimum of one course at the department's MSc program and a specialization course at MSc or PhD level, as well as supervising MSc students, PhD candidates and postdoctoral fellows.

In addition to research and education, the professor is expected to disseminate relevant parts of the research to a wider audience. The professor is also expected to participate in the formal management of research, education, innovation and other relevant areas of activity at the department.

The candidate will join a research community at ITK which was rated "excellent from an international perspective" in the last evaluation by the Norwegian Research Council of 53 ICT communities in Norway, as one of only three ICT communities to receive such a rating in the Norwegian university and college sector. Currently, two of ITK's professors are IEEE Fellows.

The full announcement can be found at
https://www.jobbnorge.no/en/available-jobs/job/188948/professor-associate-professor-in-human-machine-interaction-for-cyber-physical-systems

2. Professor/Associate Professor in Systems Engineering for Cyber-Physical Systems

The Norwegian University of Science and Technology (NTNU, http://www.ntnu.edu/) is establishing a new professorship in Systems Engineering for Cyber-Physical Systems.

The position will be affiliated with the Department of Engineering Cybernetics (Institutt for teknisk kybernetikk, ITK – http://www.ntnu.edu/itk) at NTNU's Faculty of Information Technology and Electrical Engineering in Trondheim, Norway.

ITK has 31 professors, 12 adjunct professors, about 15 postdocs and researchers as well as 80 PhD candidates. Approximately 190 candidates graduate annually from the three MSc programs in cybernetics, which comprise over 800 students in total. The department is involved in numerous research projects and centers, including the Centre of Excellence for Autonomous Marine Operations and Systems (NTNU AMOS, http://www.ntnu.edu/amos). Also, a new Centre on Research-based Innovation for autonomous ships (SFI Autoship) has recently been awarded and will start up in late 2020, with ITK as host department.

The position is within the field of Systems Engineering for Cyber-Physical Systems. Relevant such appli-

cations at the department include sensing and control in underwater robots, autonomous marine vessels, unmanned aerial systems, small satellite systems, and other cyber-physical systems.

For both position categories, the following is required:

- Doctoral degree in a relevant area
- Experience with essential areas of systems engineering for cyber-physical systems, which includes:
– Requirement analysis and specification
– Functional and architectural design
– Hardware and software architecture
– Systems implementation and integration
– Regulatory frameworks, certification, safety, reliability, maintenance, verification and validation
– Environmental factors (such as temperature, pressure, humidity, mechanics and vibrations, emissions, radiation, etc.), electromagnetic compatibility and energy management
— Packaging, documentation, quality and life-cycle management
- The autonomous vehicle research at NTNU has civilian objectives. However, some of the equipment being used is subject to export regulations or other limitations such as ITAR (International Traffic in Arms Regulations), and the position requires that the applicant has permission to use such equipment. Applicants who are citizens of Norway, Australia, New Zealand, Japan, Sweden or NATO countries will satisfy the requirements.

The professor is expected to play a leading role in research and research-based education for Systems Engineering for Cyber-Physical Systems at the department. The research activities at the department rely mainly on external funding, and the development of educational programs may also receive external funding. The professor is expected to engage extensively in applications for external funding, e.g. from the Research Council of Norway, European research and educational agencies, the industry sector, and other available sources.

MSc and PhD candidates from the cybernetics study programs are expected to be competitive in an international job market. The professor will contribute toward the department's educational profile and promote an excellent learning environment, in collaboration with colleagues, students and external stakeholders. Specifically, the professor is expected to teach a minimum of one course at the department's MSc program and a specialization course at MSc or PhD level, as well as supervising MSc students, PhD candidates and postdoctoral fellows.

In addition to research and education, the professor is expected to disseminate relevant parts of the research to a wider audience.

The professor is also expected to participate in the formal management of research, education, innovation and other relevant areas of activity at the department.

The candidate will join a research community at ITK which was rated "excellent from an international perspective" in the last evaluation by the Norwegian Research Council of 53 ICT communities in Norway, as one of only three ICT communities to receive such a rating in the Norwegian university and college sector. Currently, two of ITK's professors are IEEE Fellows.

The full announcement can be found at
https://www.jobbnorge.no/en/available-jobs/job/188926/professor-associate-professor-in-systems-engineering-for-cyber-physical-systems

3. Professor/Associate Professor in Safety and Assurance of Autonomous Systems

The Norwegian University of Science and Technology (NTNU, http://www.ntnu.edu/) is establishing a new professorship in Safety and Assurance of Autonomous Systems, in collaboration with the leading quality assurance and risk management company DNV GL (https://www.dnvgl.com/).

The position will be affiliated with the Department of Engineering Cybernetics (Institutt for teknisk kybernetikk, ITK – http://www.ntnu.edu/itk) at NTNU's Faculty of Information Technology and Electrical Engineering in Trondheim, Norway. ITK has 31 professors, 12 adjunct professors, about 15 postdocs and researchers as well as 80 PhD candidates. Approximately 190 candidates graduate annually from the three MSc programs in cybernetics, which comprise over 800 students in total. The department is involved in numerous research projects and centers, including the Centre of Excellence for Autonomous Marine Operations and Systems (NTNU AMOS, http://www.ntnu.edu/amos). Also, a new Centre on Research-based Innovation for autonomous ships (SFI Autoship) has recently been awarded and will start up in late 2020, with ITK as host department.

The position is within the field of Safety and Assurance of Autonomous Systems. Relevant such systems at the department include underwater robots, autonomous marine vessels, unmanned aerial systems, small satellite systems, and other cyber-physical systems.

For both position categories, the following is required:
• Doctoral degree in a relevant area
• Experience with essential areas of Safety and Assurance of Autonomous Systems, such as:
• Autonomous systems
• Artificial intelligence methods, including explainable AI
• Control engineering
• HIL, SIL and software testing
• Safety, reliability, availability and risk engineering
• Systems engineering
• The autonomous vehicle research at NTNU has civilian objectives. However, some of the equipment being used is subject to export regulations or other limitations such as ITAR (International Traffic in Arms Regulations), and the position requires that the applicant has permission to use such equipment.

Applicants who are citizens of Norway, Australia, New Zealand, Japan, Sweden or NATO countries will satisfy the requirements.

The professor is expected to play a leading role in research and research-based education for Safety and Assurance of Autonomous Systems at the department, in particular with impact both on improving the performance of autonomous systems in terms of safety, robustness and reliability, as well as developing a solid foundation for testing, verification and validation of such systems.

The research activities at the department rely mainly on external funding, and the development of educational programs may also receive external funding. The professor is expected to engage extensively in applications for external funding, e.g. from the Research Council of Norway, European research and educational agencies, the industry sector, and other available sources.

MSc and PhD candidates from the cybernetics study programs are expected to be competitive in an international job market. The professor will contribute toward the department's educational profile and promote an excellent learning environment, in collaboration with colleagues, students and external stakeholders. Specifically, the professor is expected to teach a minimum of one course at the department's MSc program and a specialization course at MSc or PhD level, as well as supervising MSc students, PhD candidates and postdoctoral fellows.

In addition to research and education, the professor is expected to disseminate relevant parts of the research to a wider audience.

The professor is also expected to participate in the formal management of research, education, innovation and other relevant areas of activity at the department.

The candidate will join a research community at ITK which was rated "excellent from an international perspective" in the last evaluation by the Norwegian Research Council of 53 ICT communities in Norway, as one of only three ICT communities to receive such a rating in the Norwegian university and college sector. Currently, two of ITK's professors are IEEE Fellows.

The full announcement can be found at
https://www.jobbnorge.no/en/available-jobs/job/188932/professor-associate-professor-in-safety-and-assurance-of-autonomous-systems

About NTNU, Trondheim and Norway:

- About NTNU: http://www.ntnu.edu/
- NTNU Facts and Figures: http://www.ntnu.edu/facts
- NTNU International Researcher Support: http://www.ntnu.edu/nirs
- About Trondheim: https://trondheim.com/
- About Norway: https://www.visitnorway.com/?lang=primary
- Working in Norway: https://www.nav.no/en/home
- Practical info about Norway: http://www.nyinorge.no/en/Ny-i-Norge-velg-sprak/New-in-Norway/

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6.19. R&D Engineer: The University of California - San Diego, USA

Contributed by: Jorge Cortes, cortes@ucsd.edu

The Department of Mechanical and Aerospace Engineering (MAE) is ranked as the #1 public US program and in the top 10 worldwide in the Academic Ranking of World Universities (ARWU). MAE has approximately 60 faculty and 1,300 undergraduate students. MAE has a strong research group in controls, robotics,

and dynamic systems which received a large federal grant to build a national testing facility.

MAE will build a large facility for distributed energy resources (DER) control and testing over 5 years. The DERConnect facility will serve as a national test bed for autonomous energy systems, distributed control algorithms, and electric vehicles, solar power inverters, smart buildings, and battery energy storage systems. This networked cyberphysical facility will enable the transition of the electric power system from a few centralized fossil generators to a renewable energy system with millions of interconnected, independent DERs in residences and businesses that will dramatically reduce costs and increase efficiencies.

This is a unique R&D environment that is rooted in advanced commercial technologies, but sits at the cutting edge of their applications in a world-class research university. Uses professional engineering concepts to perform moderately complex engineering assignments. Works in a specialized engineering field on a major training and/or research effort. Works on assignments of moderate scope where analysis of situations or data requires a review of a variety of factors. Will work alongside a project scientist, two postdocs, four PhD students, and a project manager.

The R&D Engineer will lead the technical implementation of DER controls, communications, operation, databases, and user interfaces. During transition to operations around 2024, we envision that the R&D Engineer would become the facility maintenance engineer. The R&D Engineer would then have the opportunity to collaborate with partners across the US in experiment execution and research papers, and maintain and upgrade state-of-the-art instrumentation in electric power systems and controls.

For further information, please visit the official listing at this link.

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6.20. ETH Zurich: Automatic Control Coordinator, Switzerland

Contributed by: Elise Cahard, ecahard@ethz.ch

Automatic Control Academic Coordinator & Scientific Coordinator/Data Manager

The Automatic Control Laboratory (IfA, https://control.ee.ethz.ch/) at ETH Zurich (Switzerland) is recruiting a Scientific Coordinator & Data Manager (50%) as well as two Automatic Control Academic Coordinator (each 50%) or one Automatic Control Academic Coordinator (100%) for the new National Centre of Competence in Research "Dependable Ubiquitous Automation" (NCCR Automation), funded by the Swiss National Science Foundation.

NCCR Automation conducts research on methods and computational tools for automatic control and automation, as well as their applications to energy management, mobility and industrial processes. Topics of interest include data driven decision making and machine learning, decision making under uncertainty, distributed control, embedded systems, optimisation, and cyber-security. In addition, the project foresees a large-scale deployment of the resulting methods to energy management at a neighbourhood scale. The Centre comprises 17 principal investigators in 4 research institutions across Switzerland (ETH Zurich, EPF Lausanne, Empa, and the University of Applied Sciences and Arts of Northwestern Switzerland); ETH Zurich serves as the Home Institution. NCCR Automation also aims to foster training, education, outreach and technology transfer activities in control and automation at all levels.

You will join the Project Office comprising a manager and officers for Knowledge and Technology Transfer, Communication, and Equal Opportunities.

Automatic Control Academic Coordinator Position: The Education and Training activities of the NCCR Automation target education in control and automation at all levels: tertiary curriculum development at the undergraduate and graduate levels, engagement of young children and high school students, as well as continuing education.

In the first available position you will play a central in developing the education and training activities of NCCR Automation towards tertiary curriculum development, such as the establishment of a strategy for these activities or the development of a PhD training program in the field of automation.

In the second available position, you will play a central role in developing the education and training activities of NCCR Automation towards primary/secondary education as well as continuing education. For example, you will develop hands-on material to expose high- and primary-school age to automation topics, and a continuing education curriculum that will be offered by instructors from academia and industry.

Each position is envisioned for a 50% commitment. Depending on the background and interests of the successful candidate, the two roles could be combined into a single full-time position. In exceptional cases it may be possible to complement the part-time commitment with additional duties in education, research, lab management, and supervision at the Automatic Control Laboratory; see also the complementary position of NCCR Scientific Coordinator & Data Manager below.

The full announcement with contact details can be found at https://bit.ly/3leVxIE
Scientific Coordinator & Data Manager: You will play a central role in promoting and facilitating the research activities of NCCR Automation. Your main duties will be:
- Monitor and promote progress towards the research objectives of NCCR Automation and collaboration among the project partners.
- Develop ideas for joint research activities and interdisciplinary platforms for knowledge exchange following the Centre's research development.
- Coordinate the Centre's scientific reporting activities, especially the production of the annual progress report.
- Establish and monitor the Centre's Data Management strategy, in collaboration with the Swiss Data Science Centre.
Depending on the qualifications and interests of the successful candidate, the role can be expanded above a 50% employment with additional duties in education, research, and supervision for the NCCR, or lab management duties at the Automatic Control Laboratory; see also the complementary position of NCCR Automatic Control Academic Coordinator above.

The full announcement with contact details can be found at https://bit.ly/3j9r6lb.

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6.21. Research Scientist: Temasek Laboratories, Singapore

Contributed by: Fang Liao, tsllf@nus.edu.sg

Research Scientist: Temasek Laboratories @ National University of Singapore, Singapore

Research Scientist Position: The Fault Tolerant Control group at Temasek Laboratories @ National University of Singapore invites applications for Research Scientist position.

Major duties:

- Develop intelligent health monitoring and fault prognosis system for UAVs
- Research on related topics and publish high-quality academic papers

Qualifications:

- A PhD degree in health monitoring and fault prognosis field
- Knowledge in machine learning, particle filtering, statistical inference, data analysis
- Strong mathematical background is preferred
- Experience in MATLAB, Python, C, C++ and LaTex
- Excellent command of English
- Knowledge of aerodynamics is a plus

Application: Please send questions or your application with a motivation letter, outlining your interest in the position, along with your curriculum vitae which should include the names and contact details of three referees, to Dr Liao Fang (TSLLF@NUS.EDU.SG).

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6.22. Control Engineer: Applied Materials, USA

Contributed by: Chunlei Zhang, chunlei_zhang@amat.com

Control Engineer Position at Applied Materials

We are currently looking for various engineers in control system analysis, design and implementation. The candidates will be involved in the development of modelling and control of various semiconductor equipment, from concept to production release.

Essential Skills Required:
- Modern control design (adaptive, predictive control, nonlinear design, etc)
- Excellent attention to detail
- Excellent hands on skills in implementation control system
- Ability to work within a team with good communication skills

Desirable:
- An graduate degree in EE/ECE area
- Experience in signal processing, process control, applied mathematics, statistics or informatics

- Experience in Python, FGPA, C++

if interested, please send email to Chunlei Zhang at chunlei_zhang@amat.com.

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