

June 2025

PUBLICATIONS CONTENT DIGEST



CSS Publications Activities

Vice-President

ANDREA SERRANI *Ohio State University*
<http://ieeecs.org/publications>

Journal Editors

IEEE Transactions on Automatic Control

ALESSANDRO ASTOLFI *Imperial College London and University of Rome “Tor Vergata”*
<http://ieeecs.org/publication/transactions-automatic-control>

IEEE Transactions on Control Systems Technology

ILYA KOLMANOVSKY *University of Michigan*
<http://ieeecs.org/publication/transactions-control-systems-technology>

IEEE Transactions on Control of Network Systems

LACRA PAVEL *University of Toronto*
<http://ieeecs.org/publication/transactions-control-network-systems>

IEEE Control Systems Letters

LAURA MENINI *University of Rome “Tor Vergata”*
<http://ieeecs.org/publication/control-systems-letters>

IEEE Control Systems Magazine

ANURADHA ANNASWAMY *Massachusetts Institute of Technology*
<http://ieeecs.org/publication/ieee-control-systems-magazine>

IEEE Open Journal of Control Systems

SONIA MARTINEZ *University of California, San Diego*
<http://ieeecs.org/publication/open-journal-control-systems>

Electronic Information

CSS State-Space Forum

FABIO PASQUALETTI *University of California, Riverside*
<https://state-space.ieeecs.org>

*Submission and editorial instructions can be found on each publication's homepage

IEEE TRANSACTIONS ON AUTOMATIC CONTROL

A PUBLICATION OF THE IEEE CONTROL SYSTEMS SOCIETY



JUNE 2025

VOLUME 70

NUMBER 6

IETAA9

(ISSN 1558-2523)

REGULAR PAPERS

On the Relationship Between Stochastic Turnpike and Dissipativity Notions	<i>J. Schießl, M. H. Baumann, T. Faulwasser, and L. Grüne</i>	3527
Preserving Topology of Network Systems: Metric, Analysis, and Optimal Design	<i>Y. Li, Z. Wang, J. He, C. Chen, and X. Guan</i>	3540
Multiobjective Complementary Control	<i>J. Xu, X. Chen, Y. Tan, and K. Zhou</i>	3556
Recursive Input–Output Linearization for Slow–Fast Realization of Nonholonomic Hamiltonian Control Systems	<i>V. Gzenda and R. Chhabra</i>	3571
Approximate Policy Iteration for Robust Stochastic Control of Multiagent Markov Decision Processes	<i>F. Huang, M. Cao, and L. Wang</i>	3587
A General Framework for the Bearing-Based Formation Control	<i>H. Cheng and J. Huang</i>	3603
Incomplete and Asymmetric Information in General Lotto Games	<i>K. Paarporn, R. Chandan, M. Alizadeh, and J. R. Marden</i>	3617
A Hamilton–Jacobi–Bellman Approach to Ellipsoidal Approximations of Reachable Sets for Linear Time-Varying Systems	<i>V. Liu, C. Manzie, and P. Dower</i>	3633
PI-Based Set-Point Learning Control for Batch Processes With Unknown Dynamics and Nonrepetitive Uncertainties ...	<i>S. Hao, T. Liu, E. Rogers, Y. Wang, and W. Paszke</i>	3649
Discrete-Time Conewise Linear Systems With Finitely Many Switches	<i>J. Daafouz, J. Lohéac, I.-C. Morărescu, and R. Postoyan</i>	3665
Secure Recursive State Estimation of Networked Systems Against Eavesdropping: A Partial-Encryption-Decryption Method	<i>L. Zou, Z. Wang, B. Shen, and H. Dong</i>	3681
Parameter Estimation and Tracking Control of MIMO Linear Systems Without Prior Knowledge of Control Signs and Parameter Bounds	<i>Y. Xu, Y. Zhang, and J.-F. Zhang</i>	3695
A Secure Resilient Homomorphic Encryption Scheme for Control Systems	<i>M. Fausser and P. Zhang</i>	3711
Distributed Model Predictive Control for Piecewise Affine Systems Based on Switching ADMM	<i>S. Mallick, A. Dabiri, and B. De Schutter</i>	3727
Motion Planning in Topologically Complex Environments via Hybrid Feedback	<i>G. S. Kanakis and G. A. Rovithakis</i>	3742
Temporal Parallelization of the HJB Equation and Continuous-Time Linear Quadratic Control	<i>S. Särkkä and Á. F. García-Fernández</i>	3755
Refined Subspace Projection for Model Reduction via Interpolation and Tensor Decomposition	<i>Y.-L. Jiang and G.-Y. Zhang</i>	3771
A Distributed Feedback-Based Framework for Nonlinear Aggregative Optimal Control	<i>L. Sforri, G. Carnevale, and G. Notarstefano</i>	3784

(Contents Continued on Page 3526)



Coordinated Multiagent Patrolling With State-Dependent Cost Rates: Asymptotically Optimal Policies for Large-Scale Systems	J. Fu, Z. Wang, and J. Chen	3800
Finite-Dimensional Backstepping Controller Design	V. K. Kalantarov, T. Özsarı, and K. C. Yılmaz	3816
Data-Driven Mode Detection and Stabilization of Unknown Switched Linear Systems	J. Eising, S. Liu, S. Martínez, and J. Cortés	3830
On Approximate Opacity of Stochastic Control Systems	S. Liu, X. Yin, D. V. Dimarogonas, and M. Zamani	3846
Distributed Constrained Continuous-Time Optimization With Input and Interaction Constraints	P. Lin, C. Zeng, J. Zhang, and Y. Xia	3862
Almost-Bayesian Quadratic Persuasion	O. Massicot and C. Langbort	3876
Learning Probabilistic Logical Control Networks: From Data to Controllability and Observability	L. Lin, J. Lam, P. Shi, M. K. Ng, and H.-K. Lam	3889
Channel Random Transmission Delays and Colored Mean-Square Small Gain Theorem	J. Lu, J. Li, and W. Su	3905
Safety-Critical Randomized Event-Triggered Learning of Gaussian Process With Applications to Data-Driven Predictive Control	K. Zheng, D. Shi, and Y. Shi	3920
Convex Computation of Value-at-Risk Bounds for Stochastic Processes	J. Miller, M. Tacchi, M. Sznaier, and A. Jasour	3936
Resilient Distributed Optimization for Multiagent Cyberphysical Systems	M. Yemini, A. Nedić, A. J. Goldsmith, and S. Gil	3952
Distributed Asynchronous Discrete-Time Feedback Optimization	G. Behrendt, M. Longmire, Z. I. Bell, and M. Hale	3968
<hr/>		
TECHNICAL NOTES		
Finite-Time Stochastic Integral Input-to-State Stability Revisited and Its Further Applications	R. Xie and S. Xu	3984
Robust String Stabilization of Connected Vehicles With Jerk Feedforward	G. Ma and S. S. Ge	3992
Distributionally Robust Kalman Filtering With Volatility Uncertainty.....	B. Han	4000
Distributed Stochastic Optimization With Unbounded Subgradients Over Randomly Time-Varying Networks	Y. Chen, A. L. Fradkov, K. Fu, X. Fu, and T. Li	4008
A Novel and Efficient Order Reduction for Both Constrained Convex Generators and Constrained Zonotopes	F. Rego and D. Silvestre	4016
Robust Dynamic Corrective Consensus Over Lossy Networks With Gilbert–Elliott Channels	S. Manfredi	4024
Approximate Constrained Discounted Dynamic Programming With Uniform Feasibility and Optimality ...	H. S. Chang	4031
Robust Stability and Stabilizability Conditions for Time-Delay Systems Under Stochastic Uncertainties	J. Chen, Q. Mao, D. Zhao, and C. Chen	4037
Resilient Supervisor Synthesis for Labeled Petri Nets Against Sensor Attacks	G. Xie, Y. Tong, X. Wang, and C. Seatzu	4045
Moment Stability Analysis of Semi-Markov Jump Stochastic Systems: Extended System Method	F. Su, W. Zhang, P. Wu, and X. Lv	4053
Performance-Guaranteed Finite-Time Tracking of Strict-Feedback Systems With Unknown Control Directions: A Novel Switching Mechanism	B. Mao, X. Wu, Z. Fan, J. Lü, and G. Chen	4061
Gradient Descent-Based Adaptive Control for Time-Varying Command Following	J. Jaramillo and T. Yucelen	4069
Effects of Adding Edges on the Consensus Convergence Rate of Weighted Directed Chain Networks	S. Gao, S. Zhang, and X. Chen	4077
Resilient Control Under Denial-of-Service and Uncertainty: An Adaptive Dynamic Programming Approach.....	W. Gao, Z.-P. Jiang, and T. Chai	4085
A Dynamic Gain Method to Event-Triggered Tracking Control for Uncertain Nonlinear Systems With Input Quantization	H. Li and M. Li	4093
Exact Penalizations for Optimal Control Problems	R. A. Grimaldi and A. Astolfi	4101
A Variance-Reduced Aggregation Based Gradient Tracking Method for Distributed Optimization Over Directed Networks	S. Zhao, S. Song, and Y. Liu	4109
A Geometric Approach to Stability Analysis of Asymmetric or Random Delayed Network Dynamics	S. Zhou, L. Yang, X. Qian, and W. Lin	4116
Optimal Output Feedback Learning Control for Continuous-Time Linear Quadratic Regulation.....	K. Xie, M. Guay, M. Lu, S. Wang, and F. Deng	4124
Distributed Consensus Control of Nonlinear Multiagent Systems With Output Noises via a Switching Classification Approach	K. Li, S. X. Ding, C. Hua, Y. Li, and Y. Yang	4132

Event-Triggered Adaptive Prescribed-Time Tracking for Nonlinear Systems With Nonvanishing Uncertainties	4140
..... C.-H. Zhang, Y.-J. Li, C.-C. Hua, Z.-Y. Sun, and Y. Zhang	
Continuity and Boundedness of Minimum-Norm CBF-Safe Controllers	4148
..... M. Alyaseen, N. Atanasov, and J. Cortés	
Convergence Analysis of Weighted-Median Opinion Dynamics With Prejudice	4155
..... R. Zhang, Z. Liu, G. Chen, and W. Mei	
Meta-Learning Online Control for Linear Dynamical Systems	4163
..... D. Muthirayan, D. Kalathil, and P. P. Khargonekar	
Secure-by-Construction Synthesis for Control Systems	4170
..... B. Zhong, S. Liu, M. Caccamo, and M. Zamani	
Identifiability and Observability of Nonsmooth Systems via Taylor-Like Approximations	4178
..... P. Stechlinski, S. A. Eisa, and H. Abdelfattah	
Distributed Minimum-Time Consensus Prediction for High-Order Multiagent Systems	4186
..... F. Hu, H.-T. Zhang, B. Xu, and Z. Hu	
Fault-Tolerant Properties of Scale-Free Linear Protocols for Synchronization of Homogeneous Multiagent Systems	4194
..... A. A. Stoer Vogel, A. Saberi, and Z. Liu	
Data-Driven Optimal Output Regulation for Continuous-Time Linear Systems via Internal Model Principle	4202
..... L. Lin and J. Huang	
Deep Learning of Delay-Compensated Backstepping for Reaction-Diffusion PDEs	4209
..... S. Wang, M. Diagne, and M. Krstić	
Multiagent Reinforcement Learning for Constrained Markov Decision Processes by Consensus-Based Primal–Dual Method	4217
..... G. Cui, Q.-S. Jia, and X. Guan	
Solo Adaptation for Distributed Synchronization With Application to Event-Triggered Linear Multiagent Systems	4225
..... C. Chen, Z. Zheng, F. L. Lewis, K. Xie, and S. Xie	
<hr/>	
COMMENTS AND CORRECTIONS	
Comments on “Relaxed Conditions for the Input-to-State Stability of Switched Nonlinear Time-Varying Systems”	4233
..... G. Šahane and S. Trenn	

IEEE

CONTROL SYSTEMS LETTERS

A PUBLICATION OF THE IEEE CONTROL SYSTEMS SOCIETY



2025

VOLUME 9

NUMBER 2 (PAPERS from 15 to 32)

PAPERS

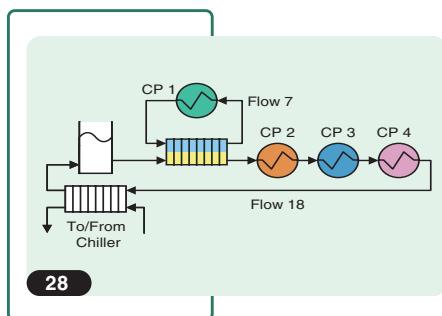
- Robust Output-Feedback MPC for Nonlinear Systems With Applications to Robotic Exploration, *S. Brown, M. Khajenejad, A. Suresh and S. Martínez* pp. 90-95
- Periodic Convergence for a Class of Nonlinear Time-Delay Systems, *A. Aleksandrov, D. Efimov and X. Ping* pp. 96-101
- Event-Based Output Feedback Stabilization Using Sliding Mode Technique, *S. Mondal and K. Kumari* pp. 102-107
- Optimal Preconditioning for Online Quadratic Cone Programming, *A. G. Kamath, P. Elango and B. Açıkmeşe* pp. 108-113
- Event-Triggered Control of Delayed Linear Systems Using Linear Programming, *H. S. Nguyen* pp. 114-119
- Continuous-Time Heavy-Ball Gradient Method: Safety, Stability and Robustness, *K. Shenoy, A. D. Mahindrakar and U. Vaidya* pp. 120-125
- Anti-Windup for Internal Model Control With Asymmetric Input Saturation, *A. A. Adegbeye, O. S. Owolabi, K. S. Ogunba and A. M. Jubril* pp. 126-131
- Equilibria Computation of the Weakest-Link Discrete Colonel Blotto Games, *A. Ravi Ibrahim and Y. E. Nugraha* pp. 132-137
- The Impact of Social Value Orientation on Nash Equilibria of Two Player Quadratic Games, *D. J. Calderone and M. Oishi* pp. 138-143
- Multi-Stable Monotone Networks, *R. Watanabe, Y. Kawano and N. Wada* pp. 144-149
- Verification of Stochastic Systems Under Signal Temporal Logic Specifications, *L. Ma, Z. Liu, H. Yu and Y. Chen* pp. 150-155
- Dynamic Tube-MPC for Underactuated Mechanical Systems With Matched and Unmatched Disturbances, *G. Bastos and E. Franco* pp. 156-161
- Kernel-Based Estimation of Frequency Response Function of Strictly Passive Systems, *S. Ebrahimkhani and J. Lataire* pp. 162-167
- A Laplace Duality for Integration, *J. B. Lasserre*, pp. 168-173
- Parameterized Feedback Linearization of Nonlinear Discrete-Time Control Systems, *A. Kaldmäe and Ü. Kotta* pp. 174-179
- Distributed and Localized Covariance Control of Coupled Systems: A System Level Approach, *A. Khalil, Y. Lee and E. Bakolas* pp. 180-185
- PAC Learnability of Scenario Decision-Making Algorithms: Necessary Conditions and Sufficient Conditions, *G. O. Berger and R. M. Jungers* pp. 186-191
- Geometric Interpretation of Sensitivity to Structured Uncertainties in Spintronic Networks, *S. P. O'Neil, E. A. Jonckheere and S. Schirmer* pp. 192-197

IEEE Control Systems

June 2025 Volume 45 Number 3

WWW.IEEECS.ORG/PUBLICATIONS/CSM

» FEATURES



COVER ART CREATED BY ChatGPT

DESCRIPTION OF THE COVER ART:

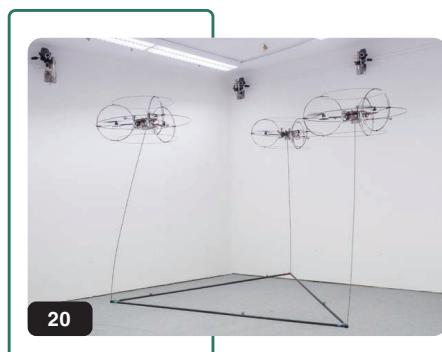
GRAPHIC CREATED USING ChatGPT. DEPICTION OF ENERGY SYSTEMS AS A CRITICAL PART OF INFRASTRUCTURE.

28 An Approach to Simultaneous Topology, Parametric, and Feedback Control Co-design

Applications to Conservation-Based Energy Systems

CHRISTOPHER T. AKSLAND and ANDREW G. ALLEYNE

» DEPARTMENTS



3 FROM THE EDITOR

Transitions

5 ABOUT THIS ISSUE

Conservation-Based Energy Systems

7 PRESIDENT'S MESSAGE

Learning the Fundamentals: Some Thoughts on the Present and Future of Controls

11 25 YEARS AGO

Nonlinear Model Predictive Control Using Neural Networks

15 MEMBER ACTIVITIES

From the Ground Up: IEEE NextCom's Inaugural Year of Impact and Growth

19 PUBLICATION ACTIVITIES

Biographical Sketches for the New Associate Editors

20 TECHNICAL ACTIVITIES

IEEE CSS TC on Distributed Parameter Systems
Technical Committee on Quantum Computing, Systems and Control

24 PEOPLE IN CONTROL

Karl H. Johansson

56 LECTURE NOTES

Diophantine Equation and the Euclidean Algorithm
The Matrix Exponential and the Variations-of-Constants Formula as Fixed-Point Iterations

72 Ph.D.s IN CONTROL

Gia Quoc Bao Tran



56

75 BOOKSHELF

Introduction to Quantum Control and Dynamics,
Second Edition
Hybrid Feedback Control

81 CSS BUSINESS

IEEE CSS Board of Governors Meeting
December 15, 2024

Minutes of the Control Systems Society Board of
Governors Meeting December 15, 2024

Cover 3 CONFERENCE CALENDAR

IEEE PUBLISHING OPERATIONS

445 Hoes Lane, Piscataway, NJ 08854 USA

IEEE OFFICERS

Kathleen A. Kramer, *IEEE President and CEO*
Mary Ellen Randall, *IEEE President-Elect*
Thomas M. Coughlin, *IEEE Past President*
Forrest D. Wright, *Director & Secretary*
Gerardo Barbosa, *Director & Treasurer*
Timothy P. Kurzweg, *Director & Vice President, Educational Activities*
Antonio Luque, *Director & Vice President, Member & Geographic Activities*
W. Clem Karl, *Director & Vice President, Publication Services and Products*
Gary R. Hoffman, *Director & President, Standards Association*
Dalma Novak, *Director & Vice President, Technical Activities*
Timothy T. Lee, *Director & President IEEE-USA*

IEEE EXECUTIVE STAFF

Sophia Muirhead, *Executive Director and COO*
Mojdeh Bahar, *Managing Director, Technical Activities*
Ahsaki E. Benion, *General Counsel and Chief Compliance Officer*
Russell Harrison, *Managing Director, IEEE-USA*
Karen L. Hawkins, *Chief Marketing Officer*
Steven Heffner, *Managing Director, Publications*
Donna Hourican, *Staff Executive, Corporate Activities*
Marie Hunter, *Managing Director, Conferences, Events and Experiences*
Cecelia Jankowski, *Managing Director, Member and Geographic Activities*
Kelly Lorne, *Chief of Staff to the Executive Director*
Jamie Moesch, *Managing Director, Educational Activities*
Alpesh Shah, *IEEE Standards Association Managing Director*
Thomas Siegert, *Chief Financial Officer*
Jeff Strohschein, *Chief Information Digital Officer*
Cheri N. Wideman, *Chief Human Resources Officer*

IEEE PUBLISHING OPERATIONS

Dawn Melley, *Senior Director, Publishing Operations*
Kevin Lisankie, *Director, Editorial Services*
Peter M. Tuohy, *Director, Production Services*
Neelam Khinvasara, *Associate Director, Digital Assets & Editorial Support*
Felicia Spagnoli, *Advertising Production Manager*
Katie Sullivan, *Senior Manager, Periodicals Production*
Shannon Campos, *Senior Journals Production Manager*

ADVERTISING SALES

Timothy Warder
Director of New Product and Audience Development

IEEE prohibits discrimination, harassment, and bullying. For more information, visit <https://www.ieee.org/nondiscrimination>.

MISSION STATEMENT AND SCOPE: As the official means of communication for the IEEE Control Systems Society, *IEEE Control Systems* publishes interesting, useful, and informative material on all aspects of control system technology for the benefit of control educators, practitioners, and researchers. With this mission statement in mind, *IEEE Control Systems* encourages submissions, both feature articles and columns, on all aspects of control system technology.

SUBMISSION OF MANUSCRIPTS: A feature article typically provides an in-depth treatment of either an application of control technology, a tutorial on some area of control theory, or an innovation in control education.

IEEE Control Systems publishes a variety of columns. "Applications of Control" columns are industrially oriented summaries of innovations in control technology. "Focus on Education" typically describes some aspect of education, such as novel control experiments. "Lecture Notes" can be theoretical in nature as long as they have clear tutorial value and intent. See recent issues for examples of these and other types of columns. Authors are encouraged to contact the editor-in-chief about the suitability of potential columns.

A detailed Author's Guide, a sample formatted manuscript, and LATEX template can be found at <http://ieeecs.org/publication/ieee-control-systems-magazine>. The specifications in this guide should be followed by all submissions.

All manuscripts should be submitted electronically to the *IEEE Control Systems* website, <https://css.paperplaza.net/conferences/scripts/start.pl>, with inquiries on appropriateness of content e-mailed to r.sepulchre@eng.cam.ac.uk.

SPECIAL ISSUES: *IEEE Control Systems* encourages proposals for special issues. Proposers are encouraged to contact the editor-in-chief to discuss potential topics.

BOOKS AND CONFERENCES: Submit information about recently published books to the associate editor for book reviews. Submit information about past and future conferences to the corresponding editor for conferences.

ADVERTISING: *IEEE Control Systems* accepts advertising for educational products, books, software, conferences, employment, and control-related technology. For information about advertising, contact Timothy Warder, t.warder@ieee.org, +1 732-562-6596.

IEEE CONTROL SYSTEMS—(ISSN 1066-033X) (ISMAD7) is published bimonthly by The Institute of Electrical and Electronics Engineers, Inc. Headquarters: 3 Park Avenue, 17th Floor, New York, NY 10016, U.S.A. +1 212 419 7900. Responsibility for the contents rests upon the authors and not upon the IEEE, the Society, or its members. To order individual copies for members and nonmembers, please e-mail the IEEE Contact Center at contactcenter@ieee.org. Member and nonmember subscription prices available on request. Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limits of the U.S. Copyright law for private use of patrons: 1) those post-1977 articles that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01970, U.S.A.; and 2) pre-1978 articles without fee. For other copying, reprint, or republication permission, write to: Copyrights and Permissions Department, IEEE Service Center, 445 Hoes Lane, Piscataway NJ 08854, U.S.A. Copyright © 2025 by The Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Periodicals postage paid at New York, NY, and additional mailing offices. Postmaster: Send address changes to *IEEE Control Systems*, IEEE, 445 Hoes Lane, Piscataway, NJ 08854 U.S.A. Canadian GST #125634188 Printed in U.S.A.

UPCOMING CONFERENCES



American Control Conference ACC 2025

July 8–10, Denver, CO, USA

L-CSS option Submission
~~September 13, 2024~~ (Passed)

ACC Manuscript Submission
~~September 27, 2024~~ (Passed)

Acceptance/Rejection Notice
January 24, 2025

Final Manuscript Submission
~~March 14, 2025~~ (Passed)

<https://acc2025.a2c2.org/>



Conference on
Control Technology and Applications
CCTA 2025

August 25–27, San Diego, USA

Tutorial Session Proposals Due

~~29 January, 2025~~ (Passed)

Invited Session Proposals Due

~~24 February, 2025~~ (Passed)

Paper Submissions Due

~~5 February, 2025~~ (Passed)

Registration Opens

mid May, 2025

Notification of Acceptance

mid May, 2025

Final Paper Uploads

30 June, 2025

<https://ccta2025.ieecss.org/>



Conference on Decision and Control **CDC 2025**

December 10–12, Rio de Janeiro, Brazil

Initial Paper Submissions to L-CSS with CDC Option Due

~~March 17, 2025~~ (Passed)

Invited Session Proposals Due

~~March 24, 2025~~ (Passed)

Initial Paper Submissions Due

~~March 31, 2025~~ (Passed)

Workshop Proposals Due

~~May 2, 2025~~ (Passed)

Decision Notification

Mid-July, 2025

Final Submissions and Advance Registration Due

September 3, 2025

<https://cdc2025.ieecss.org/>



American Control Conference

ACC 2026

May 26–29, New Orleans, LA, USA

L-CSS option Submission

September 12, 2025

ACC Manuscript Submission

September 26, 2025

Acceptance/Rejection Notice

January 23, 2026

Final Manuscript Submission

March 13, 2026

<https://acc2026.a2c2.org/>