ALI MESBAH

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EMPLOYMENT

7/20-present   Associate Professor, Department of Chemical and Biomolecular Engineering
University of California, Berkeley, California

Affiliated with the NASA Center for Utilization of Biological Engineering in Space (CUBES)

Affiliated with the DOE Center for Low Temperature Plasma Interactions with Complex Interfaces (PICI)

Affiliated with the Center for Information Technology Research in the Interest of Society (CITRIS) and the Banatao Institute, University of California, Berkeley

7/14-6/20   Assistant Professor, Department of Chemical and Biomolecular Engineering
University of California, Berkeley, California

6/12-6/14   Senior Postdoctoral Associate, Department of Chemical Engineering
Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts
Advisor: Richard D. Braatz

1/11-5/12   Postdoctoral Fellow, Delft Center for Systems and Control
Delft University of Technology, Delft, The Netherlands
Advisor: Paul M. J. Van Den Hof

EDUCATION

Ph.D., Systems and Control (December 2010)
Delft University of Technology
Advisors: Paul M. J. Van Den Hof and Herman M. J. Kramer

Graduate Degree, Systems and Control Theory (October 2008)
Dutch Institute of Systems and Control

M.S., Chemical Engineering (July 2006)
Delft University of Technology
Advisor: Freek Kapteijn

B.S., Chemical Engineering (July 2004)
University of Tehran
Advisor: Ali Vatani

PROFESSIONAL MEMBERSHIPS

- IEEE Control Systems Society – Senior Member (since 2018)
- American Institute of Chemical Engineers (AIChE) – Senior Member (since 2016)

- IEEE Control Systems Society Technical Committee on Process Control
- IEEE Control Systems Society Technical Committee on Systems with Uncertainty
- IFAC Technical Committee on Chemical Process Control
- IFAC Technical Committee on Robust Control
- IFAC Technical Committee on Optimal Control
- IFAC Technical Committee on Distributed Parameter Systems
- AIChE Computing & Systems Technology Division

SELECTED ACHIEVEMENTS AND AWARDS

- Alexander von Humboldt Research Fellow, 2023
- Invited to the EU-US Frontiers of Engineering Symposium, National Academy of Engineering, 2021
- Best Application Paper Award, IFAC World Congress, 2020
- AIChE's 35 under 35 Award, 2017
- IEEE Control Systems Outstanding Paper Award, 2017
- Class of Influential Researchers, ACS Industrial & Engineering Chemistry Research, 2017
- Finalist for the Young Author Prize, IFAC World Congress, 2017
- ACS PRF Doctoral New Investigator Award, 2016
- Best Paper Award, Foundations of Systems Biology in Engineering Conference (FOSBE), 2015
- AIChE CAST – W. David Smith, Jr. Graduation Publication Award, 2015
- Completion of the Teaching Excellence Colloquium Program, College of Letters and Science, University of California, Berkeley, 2015
- Finalist for the Best Ph.D. Thesis Award, Dutch Institute of Systems and Control, 2011

PROFESIONAL SERVICE

- Chair, IEEE Control Systems Society Technical Committee on Process Control, 2021-present
- Vice Chair, IFAC Technical Committee on Chemical Process Control, 2023-present
- Associate Editor, IEEE Transactions on Control Systems Technology, 2023-present
- Associate Editor, IEEE Control Systems Letters, 2023-present
- Associate Editor, IEEE Transactions on Radiation and Plasma Medical Sciences, 2016-present
- Associate Editor, IEEE Control Systems Society Conference Editorial Board, 2015-present
- Member, Editorial Advisory Board, Chemical and Process Engineering, 2021-present
- Member, Executive Scientific Committee, International Conference on Data Driven Plasma Science, 2019-present
- Chair, The 5th International Conference on Data Driven Plasma Science, 2024
- Co-Chair, IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM), 2024
- Workshops Chair, American Control Conference, 2024
- Associate Editor and Member of the International Program Committee, IFAC World Congress, 2023
- Chair, The 5th NorCal Control Workshop, UC Berkeley, 2023
- Associate Editor, IEEE Control Systems Society Technology Conference Editorial Board, 2020-2023
- Program Coordinator – Systems and Process Control (Area 10b), Computing & Systems Technology Division – AIChE, 2023
- Guest Editor, Journal of Physics D: Applied Physics, Special Issue on Data Driven Plasma Science, 2023

- Subject Editor, Optimal Control Applications and Methods, 2019-2022
- Member of the Organizing Committee, On-line Meeting on Artificial Intelligence for Plasma Science, 2022
- Area Chair – Batch Processes, IFAC Symposium on Dynamics and Control of Process Systems (DYCOPS), 2022
- Member, IFAC Conferences Board, Task Force on Quality Control, 2021-2023
- Area Chair – Robust MPC, IFAC Conference on Nonlinear Model Predictive Control, 2021
- Area Chair – Modeling and Identification, IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM), 2021
- Program Coordinator – Applied Mathematics and Numerical Analysis (Area 10d), Computing & Systems Technology Division – AIChE, 2021
- Member of the Program Committee, IEEE Conference on Decision and Control, 2021
- Member of the Program Committee, IEEE Conference on Decision and Control, 2020
- Associate Editor and Member of the International Program Committee, IFAC World Congress, 2020
- Member of the Program Committee, American Control Conference, 2020
- Area Chair - Performance and Fault Monitoring, IFAC Symposium on Dynamics and Control of Process Systems (DYCOPS), 2019
- Associate Editor, American Control Conference – AIChE CAST, 2019
- Member of the International Program Committee, IFAC Conference on Nonlinear Model Predictive Control, 2018
- Member of the International Program Committee, IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM), 2018
- Associate Editor, American Control Conference – AIChE CAST, 2018
- Member of the Technical Activity Committee, National Institute of Innovation in Manufacturing Biopharmaceuticals (NIIMBL), 2017-2018
- Associate Editor and Member of the International Program Committee, IFAC World Congress, 2017
- Associate Editor, American Control Conference – AIChE CAST, 2017

ORGANIZED INVITED SESSIONS AND WORKSHOPS

- Workshop "*Fundamentals and Applications of Analytics and Machine Learning*" at the Foundations of Process/Product Analytics and Machine Learning, July 2023, Davis (organized with Leo Chiang and Bhushan Gopaluni)
- Open Invited Track "*Recent Advances in Automated Learning and Calibration of MPC Policies*" at the IFAC World Congress, July 2023, Yokohama (organized with Dinesh Krishnamoorthy)
- Invited Tutorial Session "*A Tutorial on Policy Learning Methods for Advanced Controller Representations*" at the American Control Conference, June 2023, San Diego
- Invited Session "*Learning and Stochastic Optimal Control*" at the American Control Conference, June 2023, San Diego (organized with Abhishek Halder)
- Workshop "*The Next Epoch of Model Predictive Control: Exploiting Machine Learning Methods for Approximation and Design*" at the IFAC Symposium on Dynamics and Control of Process Systems (DYCOPS), June 2022, Busan (organized with Joel Paulson)
- Invited Tutorial Session "*A Tutorial on Nonlinear Model Predictive Control: What Advances Are on The Horizon?*" at the American Control Conference, June 2022, Atlanta
- Workshop "*Machine Learning and Model Predictive Control*" at the IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM), June 2021, Venice (organized with Joel Paulson)
- Invited Session "*Advances in Set-based and Stochastic Methods for Estimation and Control of Nonlinear Systems*" at the IFAC International Symposium on Advanced Control of Chemical

Processes (ADCHEM), June 2021, Venice (organized with Radoslav Paulen, Boris Houska, Mario Eduardo Villanueva, and Benoit Chachuat)

- Invited Session "*Recent Advances in Model Predictive Control for Uncertain Systems*" at the American Control Conference, May 2021, New Orleans (organized with Joel Paulson)
- Workshop "*Machine Learning meets Model-based Control*" at the IFAC World Congress, July 2020, Berlin (organized with Boris Houska)
- Open Invited Track "*Machine Learning and Model Predictive Control*" at the IFAC World Congress, July 2020, Berlin (organized with Sergio Lucia)
- Invited Session "*Advances in Stochastic and Set-Based Control and Estimation*" at the IFAC World Congress, July 2020, Berlin (organized with Radoslav Paulen, Boris Houska, Mario Eduardo Villanueva, and Sebastian Engell)
- Invited Session "*Advances in Stochastic and Set-based Control and Estimation*" at the IFAC Symposium on Dynamics and Control of Process Systems (DYCOPS), April 2019, Florianópolis (organized with Boris Houska and Radoslav Paulen)
- Invited Session "*Model Predictive Control under Uncertainty*" at the American Control Conference, June 2018, Milwaukee (organized with Victor Zavala)
- Invited Session "*Advances in Optimization-based Control of Complex and Uncertain Systems*" at the IFAC World Congress, July 2017, Toulouse (organized with Jay H. Lee)
- Invited Session "*Optimization-based Estimation and Predictive Control under Uncertainty*" at the 55th IEEE Conference on Decision and Control, December 2016, Las Vegas (organized with Rolf Findeisen and Sergio Lucia)
- Invited Session "*Advances in Control and Estimation of Uncertain Systems*" at the American Control Conference, July 2016, Boston (organized with Stefan Streif)
- Invited Session "*Advances in Predictive Control*" at the IFAC Symposium on Dynamics and Control of Process Systems (DYCOPS), June 2016, Trondheim (organized with Victor Zavala)
- Invited Session "*Advances in Model Predictive Control and Moving Horizon Estimation*" at the 54th IEEE Conference on Decision and Control, December 2015, Osaka (organized with Rolf Findeisen)
- Workshop "*Stochastic Model Predictive Control*" at the American Control Conference, July 2015, Chicago (organized with Stefan Streif)
- Workshop "*Model-based Estimation, Fault Diagnosis, and Control of Uncertain Nonlinear Systems Using Polynomial Chaos*" at the IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM), June 2015, Whistler (organized with Stefan Streif)
- Invited Session "*New Directions in Robust and Stochastic Model Predictive Control*" at the American Control Conference, July 2015, Chicago (organized with Stefan Streif)
- Invited Session "*Control and Estimation of Systems with Uncertainties*" at the American Control Conference, July 2015, Chicago (organized with Stefan Streif)
- Invited Session "*New Approaches on Robust Optimal Control*" at the 53rd IEEE Conference on Decision and Control, December 2014, Los Angeles (organized with Stefan Streif and Richard Braatz)
- Workshop "*Monitoring, Modeling, and Control of Crystallization Processes*" at the 18th International Symposium on Industrial Crystallization, September 2011, Zurich (organized with Herman Kramer, Zoltan Nagy, and Gilles Fevotte)

BOOK CHAPTERS

1. K. Sawlani and A. Mesbah. *Perspectives on artificial intelligence for plasma-assisted manufacturing in semiconductor industry*. In Artificial Intelligence in Manufacturing: Applications and Case Studies (Editors M. Soroush and R.D. Braatz), In Press, Elsevier, 2023.

2. A. Mesbah, I.V. Kolmanovsky, and S. Di Cairano. *Stochastic model predictive control*. In Handbook of Model Predictive Control (Editors S.V. Rakovic and W.S. Levine), 75-97, Springer, 2019.

3. J.A. Paulson, S. Streif, R. Findeisen, R.D. Braatz, and A. Mesbah. *Fast stochastic model predictive control of end-to-end continuous pharmaceutical manufacturing*. In Computer Aided Chemical Engineering (Editor R. Singh), 41, 353-378, Elsevier, 2018.

4. V.M. Ehlinger and A. Mesbah. *Model predictive control of chemical processes: A tutorial*. In Coulson and Richardson's Chemical Engineering – Volume 3B: Process Control (4th Edition, Editor S. Rohani), 367-402, Butterworth-Heinemann, 2017.

JOURNAL PUBLICATIONS

73. R. Anirudh et al. 2022 review of data-driven plasma science. *IEEE Transactions on Plasma Science*, 2023, In Press.

72. R. Soloperto, A. Mesbah, and F. Allgöwer. Safe exploration and escape local minima with model predictive control under partially unknown constraints. *IEEE Transactions on Automatic Control*, 2023, In Press.

71. A.D. Bonzanini, K. Shao, D.B. Graves, S. Hamaguchi, and A. Mesbah. Foundations of machine learning for low-temperature plasmas: Methods and case studies. *Plasma Sources Science and Technology*, 32, 2023, 024003.

70. L. Afsah-Hejri, R. Pravien, J. O'Leary, J. McGivern, R. Baxter, A. Mesbah, R. Maboudian, and R. Ehsani. Identification of volatile organic compounds (VOCs) by SPME-GC-MS to detect Aspergillus flavus infection in pistachios. *Food Control*, 154, 2023, 110033.

69. Y. Bao, K.J. Chan, A. Mesbah, and J.M. Velni. Learning-based adaptive-scenario-tree model predictive control with improved probabilistic safety using robust Bayesian neural networks. *International Journal of Robust and Nonlinear Control*, 33, 2023, 3312-3333.

68. G. Makrygiorgos, A.J. Berliner, F. Shi, D.S. Clark, A.P. Arkin, and A. Mesbah. Data-driven flow-map models for data-efficient discovery of dynamics and fast uncertainty quantification of biological and biochemical systems. *Biotechnology and Bioengineering*, 120, 2023, 803-818.

67. D. Rodrigues, K.J. Chan, and A. Mesbah. Data-driven adaptive optimal control under model uncertainty: An application to cold atmospheric plasmas. *IEEE Transactions on Control Systems Technology*, 31, 2023, 55-69.

66. P.K. Shahri, B. HomChaudhuri, S.S. Pulugurtha, A. Mesbah, and A.H. Ghasemi. Traffic congestion control using distributed extremum seeking and filtered feedback linearization control approaches. *IEEE Control Systems Letters,* 7, 2022, 1003-1008.

65. R. Mao, J. O'Leary, A. Mesbah, and J. Mittal. A deep learning framework discovers compositional order and self-assembly pathways in binary colloidal mixtures. *JACS Au*, 2, 2022, 1818-1828.

64. K. Shao, X. Pei, D.B. Graves, and A. Mesbah. Active learning-guided exploration of parameter space of air plasmas to enhance the energy efficiency of NO_x production. *Plasma Sources Science and Technology*, 31, 2022, 055018.

63. A.J. Berliner et al. Space bioprocess engineering on the horizon. *Communications Engineering*, 1, 2022, 1-8.

62. J. O'Leary, J.A. Paulson, and A. Mesbah. Stochastic physics-informed neural ordinary differential equations. *Journal of Computational Physics*, 468, 2022, 111466.

61. D. Rodrigues, G. Makrygiorgos, and A. Mesbah. Tractable global solutions to chance-constrained Bayesian optimal experiment design for arbitrary prior and noise distributions. *Journal of Process Control*, 116, 2022, 1-18.

60. D. Rodrigues and A. Mesbah. Efficient global solutions to single-input optimal control problems via approximation by sum-of-squares polynomials. *IEEE Transactions on Automatic Control*, 67, 2022, 4674-4686.

59. G. Makrygiorgos, A.D. Bonzanini, V. Miller, and A. Mesbah. Performance-oriented model learning for control via multi-objective Bayesian optimization. *Computers and Chemical Engineering*, 162, 2022, 107770. **(Invited to the Special Issue in Honor of Prof. George Stephanopoulos)**

58. J.A. Paulson, G. Makrygiorgos, and A. Mesbah. Adverserially robust Bayesian optimization for efficient auto-tuning of generic control structures under uncertainty. *AIChE Journal*, 2022, e17591. **(Invited to the Special Issue on Artificial Intelligence in Chemical Engineering)**

57. M. Laroussi et al. Low temperature plasma for biology, hygiene, and medicine: Perspective and roadmap. *IEEE Transactions on Radiation and Plasma Medical Sciences*, 6, 2022, 127-157.

56. A.D. Bonzanini, K. Shao, A. Stancampiano, D.B. Graves, and A. Mesbah. Perspectives on machine learning-assisted plasma medicine: Towards automated plasma treatment. *IEEE Transactions on Radiation and Plasma Medical Sciences*, 6, 2022, 16-32.

55. A.D. Bonzanini, D.B. Graves, and A. Mesbah. Learning-based stochastic model predictive control for reference tracking under state-dependent uncertainty: An application to atmospheric pressure plasma jets for plasma medicine. *IEEE Transactions on Control Systems Technology*, 30, 2022, 611-624.

54. D. Rodrigues and A. Mesbah. Multivariable control based on incomplete models via feedback linearization and continuous-time derivative estimation. *International Journal of Robust and Nonlinear Control*, 31, 2021, 9193-9230.

53. A.J. Berliner et al. Towards a biomanufactory on Mars. *Frontiers in Astronomy and Space Sciences*, 8, 2021, 1-14.

52. L.Z. Benet, J.K. Sodhi, G. Makrygiorgos, and A. Mesbah. There is only one valid definition of clearance: Critical examination of clearance concepts reveals the potential for errors in clinical drug dosing decisions. *The AAPS Journal*, 23, 2021, 1-8.

51. Z. Ning, L. Zhang, G. Feng, and A. Mesbah. Observation for Markov jump piecewise-affine systems with admissible region-switching paths. *IEEE Transactions on Automatic Control*, 66, 2021, 4319-4326.

50. D. Gidon, H.S. Abbas, A.D. Bonzanini, D.B. Graves, J. Mohammadpour Velni, and A. Mesbah. Data-driven LPV model predictive control of a cold atmospheric pressure plasma jet for biomaterials processing. *Control Engineering Practice*, 109, 2021, 104725.

49. J. O'Leary, R. Mao, E.J. Pretti, J.A. Paulson, J. Mittal, and A. Mesbah. Deep learning for characterizing the self-assembly of three-dimensional colloidal systems. *Soft Matter*, 17, 2021, 989-999.

48. A.D. Bonzanini, J.A. Paulson, G. Makrygiorgos, and A. Mesbah. Fast approximate learning-based multistage nonlinear model predictive control using Gaussian processes and deep neural networks. *Computers and Chemical Engineering*, 145, 2021, 107174. **(Invited to the Special Issue in Honor of Prof. Sebastian Engell)**

47. J.A. Paulson and A. Mesbah. Data-driven scenario optimization for automated controller tuning with probabilistic performance guarantees. *IEEE Control Systems Letters*, 5, 2020, 1477-1482.

46. A. Mesbah, J.A. Paulson, and R.D. Braatz. An internal model control design method for failure-tolerant control with multiple objectives. *Computers and Chemical Engineering*, 140, 2020, 106955.

45. J.A. Paulson and A. Mesbah. Approximate closed-loop robust model predictive control with guaranteed stability and constraint satisfaction. *IEEE Control Systems Letters*, 4, 2020, 719-724.

44. Z. Ning, L. Zhang, A. Mesbah, and P. Colaneri. Stability analysis and stabilization of discrete-time nonhomogeneous semi-Markov jump linear systems. *Automatica*, 120, 2020, 109080.

43. G. Makrygiorgos, G.M. Maggioni, and A. Mesbah. Surrogate modeling for fast uncertainty quantification: Application to 2D population balance models. *Computers and Chemical Engineering*, 138, 2020, 106814.

42. J. O'Leary, K. Sawlani, and A. Mesbah. Deep learning for classification of the chemical composition of particle defects on semiconductor wafers. *IEEE Transactions on Semiconductor Manufacturing*, 33, 2020, 72-85.

41. J.A. Paulson, E.D. Buehler, R.D. Braatz, and A. Mesbah. Stochastic model predictive control with joint chance constraints. *International Journal of Control*, 93, 2020, 126-139.

40. M. Witman, D. Gidon, D.B. Graves, B. Smit, and A. Mesbah. Sim-to-real transfer reinforcement learning for control of thermal effects of an atmospheric pressure plasma jet. *Plasma Sources Science and Technology*, 28, 2019, 095019.

39. J.A. Paulson, M. Martin-Casas, and A. Mesbah. Fast uncertainty quantification for dynamic flux balance analysis using non-smooth polynomial chaos expansions. *PLOS Computational Biology*, 15, 2019, e1007308.

38. D. Gidon, X. Pei, A.D. Bonzanini, D.B. Graves, and A. Mesbah. Machine learning for real-time diagnostics of cold atmospheric plasma sources. *IEEE Transactions on Radiation and Plasma Medical Sciences*, 3, 2019, 597-605.

37. D. Gidon, D.B. Graves, and A. Mesbah. Predictive Control of 2D spatial thermal dose delivery in atmospheric pressure plasma jets. *Plasma Sources Science and Technology*, 28, 2019, 085001.

36. T.A.N. Heirung, T.L.M. Santos, and A. Mesbah. Model predictive control with active learning for stochastic systems with structural model uncertainty: Online model discrimination. *Computers and Chemical Engineering*, 128, 2019, 128-140.

35. A. Mesbah and D.B. Graves. Machine learning for modeling, diagnostics, and control of non-equilibrium plasmas. *Journal of Physics D: Applied Physics*, 52, 2019, 30LT02.

34. T.A.N. Heirung and A. Mesbah. Input design for active fault diagnosis. *Annual Reviews in Control*, 47, 2019, 35-55.

33. D. Gidon, D.B. Graves, and A. Mesbah. Spatial thermal dose delivery in atmospheric pressure plasma jets. *Plasma Sources Science and Technology*, 28, 2019, 025006.

32. J.A. Paulson, M. Martin-Casas, and A. Mesbah. Optimal Bayesian experiment design for nonlinear dynamic systems with chance constraints. *Journal of Process Control*, 77, 2019, 155-171.

31. J.A. Paulson and A. Mesbah. An efficient method for stochastic optimal control with joint chance constraints for nonlinear systems. *International Journal of Robust and Nonlinear Control*, 29, 2019, 5017-5037.

30. J.A. Paulson, T.L.M. Santos, and A. Mesbah. Mixed stochastic-deterministic tube MPC for offset-free tracking in the presence of plant-model mismatch. *Journal of Process Control*, 83, 2019, 102-120.

29. T.A.N. Heirung, J.A. Paulson, S. Lee, and A. Mesbah. Model predictive control with active learning under model uncertainty: Why, when, and how. *AIChE Journal*, 64, 2018, 3071-3081. **(Invited Contribution to the Inaugural Futures Issue)**

28. K. Georgiou, J. Harte, A. Mesbah, and W.J. Riley. A method of alternating characteristics with application to advection-dominated environmental systems. *Computational Geosciences,* 22, 2018, 851-865.

27. T.A.N. Heirung, J.A. Paulson, J. O'Leary, and A. Mesbah. Stochastic model predictive control – How does it work? *Computers and Chemical Engineering*, 114, 2018, 154-170.

26. A. Mesbah. Stochastic model predictive control with active uncertainty learning: A survey on dual control. *Annual Reviews in Control*, 45, 2018, 107-117.

25. D. Gidon, B. Curtis, J.A. Paulson, D.B. Graves, and A. Mesbah. Model-based feedback control of a kHz-excited atmospheric pressure plasma jet. *IEEE Transactions on Radiation and Plasma Medical Sciences*, 2, 2018, 129-137.

24. D. Gidon, D.B. Graves, and A. Mesbah. Effective dose delivery in atmospheric pressure plasma jets for plasma medicine: A model predictive control approach. *Plasma Sources Science and Technology*, 26, 2017, 085005.

23. A. Mesbah, J.A. Paulson, R. Lakerveld, and R.D. Braatz. Model predictive control of an integrated continuous pharmaceutical manufacturing pilot plant. *Organic Process Research & Development*, 21, 2017, 844-854.

22. J.A. Paulson, M. Martin-Casas, and A. Mesbah. Input design for online fault diagnosis of nonlinear systems with stochastic uncertainty. *Industrial & Engineering Chemistry Research*, 56, 2017, 9593-9605. **(Invited Contribution to the 2017 Class of Influential Researchers)**

21. E.A. Buehler and A. Mesbah. Kinetic study of acetone-butanol-ethanol fermentation in continuous culture. *PLOS One*, 11, 2016, e0158243.

20. M. Martin-Casas and A. Mesbah. Discrimination between competing model structures of biological systems in the presence of population heterogeneity. *IEEE Life Sciences Letters*, 2, 2016, 1-4.

19. A. Mesbah. Stochastic model predictive control: An overview and perspectives for future research. *IEEE Control Systems*, 36, 2016, 30-44.

18. A. Mesbah, X. Bombois, H. Hjalmarsson, and P.M.J. Van den Hof. Least-costly closed-loop performance diagnosis and plant re-identification. *International Journal of Control*, 88, 2015, 2264-2276.

17. J.A. Paulson, A. Mesbah, X. Zhu, M.C. Molaro, and R.D. Braatz. Control of self-assembly in micro- and nano-scale systems. *Journal of Process Control*, 27, 2015, 38-49.

16. M. Forgione, G. Birpoursoukis, X. Bombois, A. Mesbah, P. Daudey, and P.M.J. Van den Hof. Batch-to-batch model improvement for cooling crystallization. *Control Engineering Practice*, 41, 2015, 72-82.

15. A.A. Bachnas, R. Toth, J.H.A. Ludlage, and A. Mesbah. A review on data-driven linear parameter-varying modeling approaches: A high-purity distillation column case study. *Journal of Process Control*, 24, 2014, 272-285.

14. A. Mesbah, A.N. Ford Versypt, X. Zhu, and R.D. Braatz. Nonlinear model-based control of thin-film drying for continuous pharmaceutical manufacturing. *Industrial & Engineering Chemistry Research*, 53, 2014, 7447-7460.

13. A. Mesbah, Z.K. Nagy, A.E.M. Huesman, H.J.M. Kramer, and P.M.J. Van den Hof. Nonlinear model-based control of a semi-industrial batch crystallizer using a population balance modeling framework. *IEEE Transactions on Control Systems Technology*, 20, 2012, 1188-1201.

12. S. Kadam, A. Mesbah, E. van der Windt, and H.J.M. Kramer. Rapid online calibration for ATR-FTIR spectroscopy during Batch crystallization of ammonium sulphate in a semi-industrial scale crystallizer. *Chemical Engineering Research and Design*, 89, 2011, 995–1005.

11. A. Mesbah, A.E.M. Huesman, H.J.M. Kramer, and P.M.J. Van den Hof. A comparison of nonlinear observers for output feedback model-based control of seeded batch crystallization processes. *Journal of Process Control*, 21, 2011, 652–666.

10. A. Mesbah, A.E.M. Huesman, H.J.M. Kramer, Z.K. Nagy, and P.M.J. Van den Hof. Real-time control of a semi-industrial fed-batch evaporative crystallizer using different direct optimization strategies. *AIChE Journal*, 57, 2011, 1557–1569.

9. A. Mesbah, J. Landlust, C. Versteeg, A.E.M. Huesman, H.J.M. Kramer, J.H.A. Ludlage, and P.M.J. Van den Hof. Model-based optimal control of industrial batch crystallizers. *Computer Aided Chemical Engineering*, 28, 2010, 1563-1568.

8. A. Mesbah, J. Landlust, A.E.M. Huesman, H.J.M. Kramer, P.J. Jansens, and P.M.J. Van den Hof. A model-based control framework for industrial batch crystallization processes. *Chemical Engineering Research and Design*, 88, 2010, 1223-1233.

7. A. Mesbah, H.J.M. Kramer, A.E.M. Huesman, and P.M.J. Van den Hof. A control oriented study on the numerical solution of the population balance equation for crystallization processes. *Chemical Engineering Science*, 64, 2009, 4262-4277.

6. F. Abdolahi Demneh, A. Mesbah, and A. Jaberi. Comparative evaluation of natural gas pipeline simulators. *PetroMin*, July-September Issue, 2008, 6-8.

5. F.A. Demneh and A. Mesbah. The effect of kinetic energy change on flow in gas pipelines. *Journal of Hydrocarbon Processing*, May Issue, 2008, 1-4.

4. A.N. Ajah, A. Mesbah, J. Grievink, P.M. Herder, P.W. Falcao, and S. Wennekes. On the robustness, effectiveness and reliability of chemical and mechanical heat pumps for low-temperature heat source district heating: A comparative simulation-based analysis and evaluation. *Journal of Energy*, 33, 2008, 908-929.

3. A.N. Ajah, A. Mesbah, J. Grievink, A.C. Patil, P.M. Herder, and R.M. Stikkelman. Conceptual design of a hythane based infrastructure system for combined power and district heat production. *Chemical Engineering Transactions*, 12, 2007, 459-464.

2. F. Abdolahi, A. Mesbah, R.B. Boozarjomehry, and W.Y. Svrcek. The effect of major parameters on simulation results of gas pipelines. *International Journal of Mechanical Sciences*, 49, 2007, 989-1000.

1. A. Mesbah and F. Abdolahi. Natural gas supply cut-off in gas distribution networks. *PetroMin*, September Issue, 2006, 34-36.

PEER-REVIEWED PROCEEDINGS PUBLICATIONS

73. G. Makrygiorgos, J.A. Paulson, and A. Mesbah. No-regret Bayesian optimization with gradients using local optimality-based constraints: Application to closed-loop policy search. In *Proceedings of the 62nd IEEE Conference on Decision and Control*, Accepted, 2023, Singapore. **(Invited)**

72. K.J. Chan, J.A. Paulson, and A. Mesbah. Safe explorative Bayesian optimization - Towards personalized treatments in plasma medicine. In *Proceedings of the 62nd IEEE Conference on Decision and Control*, Accepted, 2023, Singapore. **(Invited)**

71. K.T. Hoang, S. Boersma, A. Mesbah, and L. Imsland. Heteroscedastic Bayesian optimisation for active power control of wind farms. In *Proceedings of the IFAC World Congress*, 8289-8294, 2023, Yokohama.

70. D. Rodrigues and A. Mesbah. Adaptive global solutions to single-input optimal control problems via Gaussian processes. In *Proceedings of the IFAC World Congress*, 5275-5280, 2023, Yokohama.

69. G. Makrygiorgos, J.A. Paulson, and A. Mesbah. Gradient-enhanced Bayesian optimization via acquisition ensembles with application to reinforcement learning. In *Proceedings of the IFAC World Congress*, 698-703, 2023, Yokohama. **(Invited)**

68. J.A. Paulson, F. Sorourifar, and A. Mesbah. A tutorial on derivative-free policy learning methods for interpretable controller representations. In *Proceedings of the American Control Conference*, 1295-1306, 2023, San Diego. **(Invited Tutorial Session)**

67. I. Nodozi, J. O'Leary, A. Mesbah, and A. Halder. A physics-informed deep learning approach for minimum effort stochastic control of self-assembly. In *Proceedings of the American Control Conference*, 609-615, 2023, San Diego.

66. K.J. Chan, G. Makrygiorgos, and A. Mesbah. Towards personalized plasma medicine via data-efficient adaptation of fast deep learning-based MPC policies. In *Proceedings of the American Control Conference*, 2769-2775, 2023, San Diego.

65. J. O'Leary, M.M. Khare, and A. Mesbah. Novelty search for neuroevolutionary reinforcement learning of deceptive systems: An application to control of colloidal self-assembly. In *Proceedings of the American Control Conference*, 2776-2781, 2023, San Diego.

64. A.D. Bonzanini, G. Makrygiorgos, J.A. Paulson, and A. Mesbah. Scalable estimation of invariant sets for mixed-integer nonlinear systems using active deep learning. In *Proceedings of the 61st IEEE Conference on Decision and Control*, 3431-3437, 2022, Cancun. **(Invited)**

63. A. Mesbah, K.P. Wabersich, A.P. Schoellig, M.N. Zeilinger, S. Lucia, T. Badgwell, and J.A. Paulson. Fusion of machine learning and MPC under uncertainty: What advances are on the horizon? In *Proceedings of the American Control Conference*, 342-357, 2022, Atlanta. **(Invited Tutorial Session)**

62. A.D. Bonzanini, A. Mesbah, and S. Di Cairano. Multi-stage perception-aware chance-constrained MPC with applications to automated driving. In *Proceedings of the American Control Conference*, 1697-1702, 2022, Atlanta.

61. Y. Bao, K. Chan, A. Mesbah, and J. Mohammadpour Velni. Learning- and scenario-based model predictive control with probabilistic safety guarantees using Bayesian neural networks. In *Proceedings of the American Control Conference*, 3260-3265, 2022, Atlanta.

60. A.D. Bonzanini, A. Mesbah, and S. Di Cairano. On the stability properties of perception-aware chance-constrained MPC in uncertain environments. In *Proceedings of the 60th IEEE Conference on Decision and Control*, 2177-2182, 2021, Austin. **(Invited)**

59. J.A. Paulson, K. Shao, and A. Mesbah. Probabilistically robust Bayesian optimization for data-driven design of arbitrary controllers with Gaussian process emulators. In *Proceedings of the 60th IEEE Conference on Decision and Control*, 3633-3639, 2021, Austin. **(Invited)**

58. D. Krishnamoorthy, A. Mesbah, and J.A. Paulson. An adaptive correction scheme for offset-free asymptotic performance in deep learning-based economic MPC. In *Proceedings of the IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM)*, 584-589, 2021, Venice.

57. F. Sorourifar, G. Makrygiorgos, A. Mesbah, and J.A. Paulson. A data-driven automatic tuning method for MPC under uncertainty using constrained Bayesian optimization. In *Proceedings of the IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM)*, 243-250, 2021, Venice.

56. A.D. Bonzanini, A. Mesbah, and S. Di Cairano. Perception-aware chance-constrained model predictive control for uncertain environments. In *Proceedings of the American Control Conference*, 2078-2083, 2021, New Orleans.

55. K. Chan, J.A. Paulson, and A. Mesbah. Deep learning-based approximate nonlinear model predictive control with offset-free tracking for embedded applications. In *Proceedings of the American Control Conference*, 3466-3472, 2021, New Orleans. **(Invited)**

54. A.D. Bonzanini, J.A. Paulson, and A. Mesbah. Safe learning-based model predictive control under state- and input-dependent uncertainty using scenario trees. In *Proceedings of the 59th IEEE Conference on Decision and Control*, 2448-2454, 2020, Jeju Island, Republic of Korea. **(Invited)**

53. D. Rodrigues, G. Makrygiorgos, and A. Mesbah. Tractable global solutions to Bayesian optimal experiment design. In *Proceedings of the 59th IEEE Conference on Decision and Control*, 1614-1619, 2020, Jeju Island, Republic of Korea.

52. J.A. Paulson and A. Mesbah. A low-complexity tube controller using contractive invariant sets. In *Proceedings of the 59th IEEE Conference on Decision and Control*, 899-904, 2020, Jeju Island, Republic of Korea.

51. A.D. Bonzanini and A. Mesbah. Learning-based stochastic model predictive control with state-dependent uncertainty. In *Proceedings of Machine Learning Research*, 120, 1-10, 2020.

50. A.D. Bonzanini, J.A. Paulson, D.B. Graves, and A. Mesbah. Toward safe dose delivery in plasma medicine using projected neural network-based fast approximate NMPC. In *Proceedings of the IFAC World Congress*, 5353-5359, 2020, Berlin. **(Received the Best Application Paper Award of the IFAC World Congress)**

49. G. Makrygiorgos, S. Sen Gupta, A.A. Menezes, and A. Mesbah. Fast probabilistic uncertainty quantification and sensitivity analysis of a Mars life support system model. In *Proceedings of the IFAC World Congress*, 7358-7363, 2020, Berlin.

48. T.L.M. Santos, V.M. Cunha, and A. Mesbah. Stochastic model predictive control with adaptive chance constraints based on empirical cumulative distribution. In *Proceedings of the IFAC World Congress*, 11408-11414, 2020, Berlin.

47. F. Petzke, A. Mesbah, and S. Streif. PoCET: a polynomial chaos expansion toolbox for Matlab. In *Proceedings of the IFAC World Congress*, 7346-7351, 2020, Berlin.

46. T.L.M. Santos, A.D. Bonzanini, T.A.N. Heirung, and A. Mesbah. A constraint-tightening approach to nonlinear model predictive control with chance constraints for stochastic systems. In *Proceedings of the American Control Conference*, 1641-1647, 2019, Philadelphia.

45. J.A. Paulson, T.A.N. Heirung, and A. Mesbah. Fault-tolerant tube-based robust nonlinear model predictive control. In *Proceedings of the American Control Conference*, 1648-1654, 2019, Philadelphia.

44. S. Bhonsale, P. Nimmegeers, D. Telen, J.A. Paulson, A. Mesbah, and J. Van Impe. On the implementation of polynomial chaos in dynamic optimization under uncertainty: A user perspective. In *Proceedings of the 29th European Symposium on Computer Aided Process Engineering*, 541-546, 2019, Eindhoven.

43. A.D. Bonzanini, T.L.M. Santos, and A. Mesbah. Tube-based stochastic nonlinear model predictive control: A comparative study on constraint tightening. In *Proceedings of the 12th IFAC International Symposium on Dynamics and Control of Process Systems (DYCOPS)*, 598-603, 2019, Florianópolis.

42. J.A. Paulson and A. Mesbah. Arbitrary polynomial chaos for quantification of general probabilistic uncertainties: Shaping closed-loop behavior of nonlinear systems. In *Proceedings of the 57th IEEE Conference on Decision and Control*, 6307-6313, 2018, Miami.

41. J.A. Paulson and A. Mesbah. Nonlinear Model Predictive Control with Explicit Backoffs for Stochastic Systems under Arbitrary Uncertainty. In *Proceedings of the 6th IFAC Conference on Nonlinear Model Predictive Control*, 622-633, 2018, Madison.

40. M. Martin-Casas and A. Mesbah. Active fault diagnosis for stochastic nonlinear systems: Online probabilistic model discrimination. In *Proceedings of the IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM)*, 696-701, 2018, Shenyang.

39. T.L.M. Santos, J.A. Paulson, and A. Mesbah. Stochastic model predictive control with enlarged domain of attraction for offset-free tracking. In *Proceedings of the American Control Conference*, 742-748, 2018, Milwaukee.

38. J.A. Paulson, T.A.N. Heirung, R.D. Braatz, and A. Mesbah. Closed-loop active fault diagnosis for stochastic linear systems. In *Proceedings of the American Control Conference*, 735-741, 2018, Milwaukee.

37. G.R. Marseglia, D.M. Raimondo, L. Magni, and A. Mesbah. A probabilistic framework for reference design for guaranteed fault diagnosis under closed-loop control. In *Proceedings of the 56th IEEE Conference on Decision and Control*, 5739-5744, 2017, Melbourne.

36. D. Gidon, B.S. Curtis, A. Mesbah, and D.B. Graves. Model-based feedback control strategies for atmospheric pressure plasma jets. In *Proceedings of the 23rd International Symposium on Plasma Chemistry*, 2017, Montreal.

35. J.A. Paulson, E.A. Buehler, and A. Mesbah. Arbitrary polynomial chaos for uncertainty propagation of correlated random variables in dynamic systems. In *Proceedings of the IFAC World Congress*, 3607-3612, 2017, Toulouse.

34. J.A. Paulson, L. Xie, and A. Mesbah. Offset-free robust MPC of systems with mixed stochastic and deterministic uncertainty. In *Proceedings of the IFAC World Congress*, 3589-3594, 2017, Toulouse.

33. T.A.N. Heirung and A. Mesbah. Stochastic nonlinear model predictive control with active model discrimination: A closed-loop fault diagnosis application. In *Proceedings of the IFAC World Congress*, 16504-16509, 2017, Toulouse.

32. T.A.N. Heirung and A. Mesbah. Perspectives on stochastic predictive control with autonomous model adaptation for model structure uncertainty. In *Proceedings of the Chemical Process Conference (CPC)*, 1-6, 2017, Tucson.

31. V.A. Bavdekar, V. Ehlinger, D. Gidon, and A. Mesbah. Stochastic predictive control with adaptive model maintenance. In *Proceedings of the 55th IEEE Conference on Decision and Control*, 2745-2750, 2016, Las Vegas.

30. V.A. Bavdekar and A. Mesbah. Stochastic nonlinear model predictive control with joint chance constraints. In *Proceedings of the 10th IFAC Symposium on Nonlinear Control Systems (NOLCOS)*, 276-281, 2016, Monterey (CA).

29. V.A. Bavdekar and A. Mesbah. Model predictive control with integrated input design for nonlinear systems with probabilistic uncertainties. In *Proceedings of the 11th IFAC International Symposium on Dynamics and Control of Process Systems (DYCOPS)*, 49-54, 2016, Trondheim.

28. D. Gidon, D.B. Graves, and A. Mesbah. Model predictive control of thermal effects of an atmospheric pressure plasma jet for biomedical applications. In *Proceedings of the American Control Conference*, 4889-4894, 2016, Boston.

27. E.A. Buehler, J.A. Paulson, and A. Mesbah. Lyapunov-based stochastic nonlinear model predictive control: Shaping the state probability distribution functions. In *Proceedings of the American Control Conference*, 5389-5394, 2016, Boston.

26. V.A. Bavdekar and A. Mesbah. A polynomial chaos-based nonlinear Bayesian approach for estimating state and parameter probability distribution functions. In *Proceedings of the American Control Conference*, 2047-2052, 2016, Boston.

25. M. Martin-Casas and A. Mesbah. Robust optimal experiment design for model discrimination and parameter estimation. *Foundations of Systems Biology in Engineering*, 2015, Boston.

24. A. Mesbah and S. Streif. A probabilistic approach for robust optimal experiment design with chance constraints. In *Proceedings of the IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM)*, 100-105, 2015, Whistler.

23. J.A. Paulson, S. Streif, and A. Mesbah. Stability for receding-horizon stochastic model predictive control. In *Proceedings of the American Control Conference*, 937-943, 2015, Chicago.

22. A. Mesbah, J.A. Paulson, R. Lakerveld, and R.D. Braatz. Plant-wide model predictive control for a continuous pharmaceutical process. In *Proceedings of the American Control Conference*, 4301-4307, 2015, Chicago.

21. J.A. Paulson, A. Mesbah, S. Streif, R. Findeisen, and R.D. Braatz. Fast stochastic model predictive control of high-dimensional systems. In *Proceedings of the 53rd IEEE Conference on Decision and Control*, 2802-2809, 2014, Los Angeles.

20. A. Mesbah, S. Streif, R. Findeisen, and R.D. Braatz. Active fault diagnosis for nonlinear systems with probabilistic uncertainties. In *Proceedings of the IFAC World Congress*, 7079-7084, 2014, CapeTown.

19. S. Streif, F. Petzke, A. Mesbah, R. Findeisen, and R.D. Braatz. Optimal experimental design for probabilistic model discrimination using polynomial chaos. In *Proceedings of the IFAC World Congress*, 4103-4109, 2014, CapeTown.

18. A. Mesbah, S. Streif, R. Findeisen, and R.D. Braatz. Stochastic nonlinear model predictive control with probabilistic constraints. In *Proceedings of the American Control Conference*, 2413-2419, 2014, Portland.

17. X. Bombois, M. Potters, and A. Mesbah. Closed-loop performance diagnosis of model predictive control systems. In *Proceedings of the European Control Conference*, 264-269, 2014, Strasbourg.

16. A. Mesbah, M. Kishida, and R.D. Braatz. Design of multi-objective failure-tolerant control systems for infinite-dimensional systems. In *Proceedings of the 52nd IEEE Conference on Decision and Control*, 3006-3013, 2013, Florence.

15. A. Mesbah and R.D. Braatz. Design of multi-objective control systems with optimal failure tolerance. In *Proceedings of the European Control Conference*, 2963-2968, 2013, Zurich.

14. A.A. Bachnas, R. Toth, A. Mesbah, and J. Ludlage. Perspectives of data-driven LPV modeling of high-purity distillation columns. In *Proceedings of the European Control Conference*, 3776-3783, 2013, Zurich.

13. C.A. Larsson, M. Annergren, H. Hjalmarsson, C.R. Rojas, X. Bombois, A. Mesbah, and P. Moden. Model predictive control with integrated experiment design. In *Proceedings of the European Control Conference*, 3790-3795, 2013, Zurich.

12. A. Mesbah, X. Bombois, M. Forgione, J.H.A. Ludlage, P.E. Moden, H. Hjalmarsson, and P.M.J. Van den Hof. A unified experiment design framework for detection and identification in closed-loop performance diagnosis. In *Proceedings of the 51st IEEE Conference on Decision and Control*, 2152-2157, 2012, Hawaii.

11. M. Forgione, A. Mesbah, X. Bombois, and P.M.J. Van den Hof. Batch-to-batch strategies for cooling crystallization. In *Proceedings of the 51st IEEE Conference on Decision and Control*, 6364-6369, 2012, Hawaii.

10. A. Mesbah, X. Bombois, J.H.A. Ludlage, and P.M.J. Van den Hof. Experiment design for closed-loop performance diagnosis. In *Proceedings of the 16th IFAC Symposium on System Identification*, 1341-1346, 2012, Brussels.

9. M. Forgione, A. Mesbah, X. Bombois, and P.M.J. Van den Hof. Iterative learning control of supersaturation in batch cooling crystallization. In *Proceedings of the American Control Conference*, 6455-6460, 2012, Montreal.

8. A. Mesbah, X. Bombois, J.H.A. Ludlage, and P.M.J. Van den Hof. Closed-loop performance diagnosis using prediction error identification. In *Proceedings of the 50th IEEE Conference on Decision and Control and European Control Conference*, 2969-2974, 2011, Orlando.

7. A. Mesbah, A.E.M. Huesman, H.J.M. Kramer, and P.M.J. Van den Hof. Nonlinear state estimation for closed-loop control of batch crystallization processes. In *Proceedings of the 9th International Symposium on Dynamics and Control of Process Systems (DYCOPS)*, 371-376, 2010, Leuven.

6. S. Kadam, A. Mesbah, E. van der Windt, and H.J.M. Kramer. Application of ATR FTIR spectroscopy for in-situ concentration measurements of ammonium sulphate on laboratory and pilot plant scales. In *Proceedings of the 16th Bremen International Workshop on Industrial Crystallization*, 69-76, 2009, Lappeenranta.

5. A. Mesbah, A.N. Kalbasenka, A.E.M. Huesman, H.J.M. Kramer, and P.M.J. Van den Hof. Real-time dynamic optimization of batch crystallization processes. In *Proceedings of the 17th IFAC World Congress*, 3246-3251, 2008, Seoul.

4. A. Mesbah, J. Landlust, A.E.M. Huesman, H.J.M. Kramer, P.M.J. Van den Hof, and P.J. Jansens. Model-based optimal operation of seeded batch crystallization processes. In *Proceedings of the 17th International Symposium on Industrial Crystallization*, 721-728, 2008, Maastricht.

3. J. Landlust, A. Mesbah, J. Wildenberg, A.N. Kalbasenka, H.J.M. Kramer, and J. Ludlage. An industrial model predictive control architecture for batch crystallization. In *Proceedings of the 17th International Symposium on Industrial Crystallization*, 35-42, 2008, Maastricht.

2. A. Mesbah, A.N. Kalbasenka, A.E.M. Huesman, H.J.M. Kramer, P.J. Jansens, and P.M.J. Van den Hof. Real-time dynamic optimization of crystal yield in fed-batch evaporative crystallization of ammonium sulphate. In *Proceedings of the 14th Bremen International Workshop on Industrial Crystallization*, 81-88, 2007, CapeTown.

1. A.N. Ajah, A. Mesbah, J. Grievink, P.W. Falcao, and S. Wennekes. Comparative simulation-based analysis and evaluation of chemical and mechanical heat pumps robustness for Low temperature heat source upgrading. In *Proceedings of the 17th International Congress of Chemical and Process Engineering*, 2006, Prague.

INVITED AND CONFERENCE TALKS

105. Towards personalized and point-of-care plasma medicine. *Tim Taylor Department of Chemical Engineering, Kansas State University*, May 2023, Manhattan. **(Invited)**

104. Bayesian optimization for active machine learning for discovering plasma interactions with complex surfaces. *International Conference on Data-Driven Plasma Science (ICDDPS-4)*, April 2023, Okinawa, Japan. **(Invited)**

103. Bayesian optimization for performance-oriented model learning. *Robotics and Controls Seminar, University of North Carolina Charlotte,* March 2023, Charlotte. **(Invited)**

102. Plasma devices as a controllable source of RONS delivery for cancer treatment. *The 8th International Workshop on Plasma for Cancer Treatment (IWPCT)*, March 2023, Raleigh. **(Invited)**

101. Performance-oriented model learning and auto-tuning of arbitrary controllers. *Institute for Systems Theory and Automatic Control, University of Stuttgart*, December 2022, Stuttgart. **(Invited)**

100. Active machine learning to guide discovery of non-equilibrium plasma processes. *Plasma Technologies for Emerging Materials Science and Applications, MRS Fall Meeting*, December 2022, Boston. **(Invited)**

99. A tutorial on Bayesian optimization for design of experiments for low-temperature plasmas. *Online Meeting on Artificial Intelligence for Plasma Science*, November 2022. **(Invited)**

98. Towards personalized plasma medicine. *Department of Chemical and Biomolecular Engineering, Clarkson University*, October 2022. **(Invited)**

97. Data-driven methods for characterization, diagnostics and control of plasma processing of complex surfaces. *The 75th Gaseous Electronics Conference*, October 2022, Sendai, Japan. **(Invited)**

96. Active learning-guided design of experiments for non-equilibrium plasmas interacting with complex interfaces. *The 22nd International Vacuum Congress*, September 2022, Sapporo, Japan. **(Invited)**

95. Toward autonomy for safe and on-demand biomanufacturing in space. *The Sargent Center for Process Systems Engineering, Imperial College London*, June 2022. **(Invited)**

94. Perspectives on machine learning and model predictive control. *Future Innovation in Process System Engineering Conference (FIPSE)*, June 2022, Crete. **(Invited)**

93. A tutorial on active learning. *International Conference on Frontiers of Characterization and Metrology for Nanoelectronics*, June 2022, Monterey. **(Invited to Workshop on Machine Learning)**

92. Active learning for optimal design of experiments with multiple objectives for non-equilibrium plasma processes. *IEEE Symposium on VLSI Technology and Circuits*, June 2022, Honolulu. **(Invited to Session & Panel Discussion on AI)**

91. The promise of data-driven methods for diagnostics and control of plasma interactions with surfaces. *The International Conference on Metallurgical Coatings and Thin Films*, May 2022, San Diogo. **(Keynote; Session on Plasma Surface Interactions, Diagnostics, and Growth Processes)**

90. Learning-based predictive control for effective dose delivery in plasma medicine. *Department of Chemical Engineering, Howard University*, February 2022. **(Invited)**

89. Probabilistically robust Bayesian optimization for data-driven design of arbitrary controllers with Gaussian process emulators. *The 60th IEEE Conference on Decision and Control*, December 2021. **(Invited to Session on Learning-based Control)**

88. Adversarially robust Bayesian optimization for performance-oriented learning of hybrid models. *Department of Chemical Engineering, University College London*, December 2021. **(Invited)**

87. Deep learning of hidden physics in systems governed by stochastic differential equations. *Department of Applied Mathematics, University of California Santa Cruz*, November 2021. **(Invited)**

86. Toward autonomy for safe and on-demand biomanufacturing on Mars. *The Next-Gen Manufacturing Topical Conference, The AIChE Annual Meeting*, November 2021, Boston. **(Keynote)**

85. Performance-oriented model learning for optimization-based control under uncertainty. *INFORMS Annual Meeting*, October 2021, Anaheim, California. **(Invited to Session on Algorithms and Software for Optimization Under Uncertainty)**

84. Constrained Bayesian optimization for performance-oriented model learning. *School of Artificial Intelligence and Data Science, Indian Institute of Technology Jodhpur*, August 2021. **(Invited)**

83. Towards safe dose delivery in plasma medicine. *Bioengineering Department, Santa Clara University*, May 2021. **(Invited Guest Lecture)**

82. Safe learning-based predictive control of low-temperature plasmas using deep neural networks and Gaussian processes. *Online Low Temperature Plasma Seminar*, January 2021. **(Invited)**

81. Data-efficient probabilistic model learning with embedded high-fidelity knowledge for biomanufacturing in deep space manned missions. *Big Data and Applications in Advanced Modeling and Manufacturing*, *The AIChE Annual Meeting*, November 2020, San Francisco. **(Invited)**

80. Learning-based predictive control for fast sampling and safety-critical systems. *Whaley Group, University of California Berkeley*, November 2020, Berkeley. **(Invited)**

79. Safe learning-based control of plasma-surface interactions. *Workshop on AI & ML in Plasma Science & Beyond, The 73rd Annual Gaseous Electronics Conference*, October 2020. **(Invited)**

78. Towards safe dose delivery in plasma medicine. *Workshop on State-of-the-Art Applications of Model Predictive Control, The 4th IEEE Conference on Control Technology and Applications*, August 2020. **(Invited)**

77. Learning-based diagnosis and control for non-equilibrium plasmas. *Princeton Plasma Physics Laboratory*, July 2020. **(Invited)**

76. Predictive control for effective dose delivery in plasma medicine. *Department of Chemical Engineering, Massachusetts Institute of Technology*, December 2019, Cambridge. **(Invited)**

75. Advanced control of complex chemical and biological systems. *CBE Undergraduate Research Seminar, University of California Berkeley*, November 2019, Berkeley. **(Invited)**

74. Learning-based model predictive control for non-equilibrium plasmas. *The AIChE Annual Meeting*, November 2019, Orlando.

73. Polynomial chaos-based surrogate models for Bayesian learning and estimation of complex systems. *Process Systems Engineering Seminar Series, Massachusetts Institute of Technology*, October 2019, Cambridge. **(Invited)**

72. Learning-based diagnosis and control for non-equilibrium plasmas. *Lam Research Technical Symposium at MIT*, October 2019, Cambridge. **(Plenary)**

71. Machine learning for approximate model predictive control. *The 3rd AFOSR Workshop on Computational Issues in Nonlinear Control and Estimation*, October 2019, Monterey. **(Invited)**

70. Fast uncertainty quantification for biological systems. *NASA Center for the Utilization of Biological Engineering in Space (CUBES) Webinar Series*, August 2019.

69. Short course on stochastic model predictive control (8 lectures, graduate level). *Institute for Systems Theory and Automatic Control, University of Stuttgart*, July 2019, Stuttgart. **(Invited)**

68. Real-time control of dose delivery in plasma medicine. *Institute for Systems Theory and Automatic Control Seminar Series, University of Stuttgart*, July 2019, Stuttgart. **(Invited)**

67. Machine learning for process monitoring and control of cold atmospheric plasmas. *The 2nd International Conference on Data Driven Plasma Science*, May 2019, Marseille. **(Invited)**

66. Surrogate modeling for Bayesian learning and estimation of complex systems. *Pitzer Center for Theoretical Chemistry Seminar Series, University of California Berkeley*, April 2019, Berkeley. **(Invited)**

65. Polynomial chaos-based surrogate models for optimization and control under uncertainty. *The Center for Control, Dynamical Systems, and Computation Seminar Series, University of California Santa Barbara*, February 2019, Santa Barbara. **(Invited)**

64. Arbitrary polynomial chaos for quantification of general probabilistic uncertainties: Shaping closed-loop behavior of nonlinear systems. *IEEE Conference on Decision and Control*, December 2018, Miami.

63. Real-time control of dose delivery in plasma medicine. *Department of Chemical Engineering, Carnegie Mellon University*, December 2018, Pittsburg. **(Invited)**

62. Surrogate models for optimization and control under uncertainty. *The Center for Advanced Process Decision-Making Seminar Series, Carnegie Mellon University*, December 2018, Pittsburg. **(Invited)**

61. Arbitrary polynomial chaos for uncertainty quantification of stochastic nonlinear systems. *Department of Industrial Engineering and Operations Research, University of California Berkeley*, November 2018, Berkeley. **(Invited)**

60. Real-time control of dose delivery in plasma medicine. *Department of Chemical and Biomolecular Engineering, University of Delaware*, November 2018, Newark. **(Invited)**

59. Real-time control of spatial dose delivery in plasma medicine. *The Cyber-Physical Systems Research Center seminar series, University of California Santa Cruz*, November 2018, Santa Cruz. **(Invited)**

58. Learning-based nonlinear model predictive control with chance constraints for stochastic systems. *The AIChE Annual Meeting*, October 2018, Pittsburg.

57. An optimization-based feedback control strategy for spatially uniform dose delivery using atmospheric pressure plasma jets. *The AIChE Annual Meeting*, October 2018, Pittsburg.

56. Optimization-based analysis of biological systems in the presence of uncertainty. *Berkeley Synthetic Biology Institute*, October 2018, Santa Clara (Agilent). **(Invited)**

55. Data analytics for advanced process control: Case studies in cold atmospheric pressure plasmas. *The Office of Chief Technology Officer Seminar Series, Lam Research*, September 2018, Fremont. **(Invited)**

54. Polynomial chaos for uncertainty quantification: Applications to optimization under uncertainty. *Center for Process Systems Engineering Summer School, Imperial College London*, September 2018, London. **(Invited)**

53. Nonlinear Model Predictive Control with Explicit Backoffs for Stochastic Systems under Arbitrary Uncertainty. *IFAC Conference on Nonlinear Model Predictive Control*, August 2018, Madison. **(Keynote)**

52. Generalized chaos expansions with arbitrary probability measures for uncertainty quantification of stochastic nonlinear systems. *International Workshop on Advanced Methods for Control and Estimation of Dynamic Systems (AMCEDS)*, July 2018, Shanghai. **(Invited)**

51. Active fault diagnosis for stochastic nonlinear systems: Online probabilistic model discrimination. *IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM)*, July 2018, Shenyang.

50. Stochastic model predictive control with enlarged domain of attraction for offset-free tracking. *American Control Conference*, June 2018, Milwaukee.

49. Closed-loop active fault diagnosis for stochastic linear systems. *American Control Conference*, June 2018, Milwaukee.

48. Arbitrary polynomial chaos for uncertainty quantification of correlated random variables in nonlinear systems. *AIChE Webinar Series-CAST*, March 2018. **(Invited)**

47. A probabilistic framework for reference design for guaranteed fault diagnosis under closed-loop control. *IEEE Conference on Decision and Control*, December 2017, Melbourne.

46. Feedback control for dose delivery in plasma medicine. *Department of Chemical and Biological Engineering, Drexel University*, December 2017, Philadelphia. **(Invited)**

45. Feedback control for dose delivery in plasma medicine. *Department of Chemical and Biomolecular Engineering, Lehigh University*, November 2017, Bethlehem (PA). **(Invited)**

44. Effective dose delivery in plasma medicine using a robust MPC approach for mixed stochastic and deterministic uncertainty. *The AIChE Annual Meeting*, October 2017, Minneapolis.

43. Machine learning. *Lam Technology Conference*, May 2017, Monterey. **(Invited)**

42. Optimization-based estimation and control of complex systems. *Applied Mathematics Seminar, University of California Berkeley*, May 2017, Berkeley. **(Invited)**

41. Model predictive control of atmospheric pressure plasma jets for effective dose delivery. *The 4th International Workshop on Plasma for Cancer Treatment*, March 2017, Paris. **(Invited**, **Declined)**

40. Stochastic predictive control with autonomous model adaptation for model structure uncertainty. *Chemical Process Control Conference (CPC)*, January 2017, Tucson. **(Invited)**

39. Effective dose delivery using atmospheric pressure plasma jets for plasma medicine. *Department of Chemical and Biological Engineering, University of Wisconsin-Madison*, November 2016, Madison. **(Invited)**

38. Perspectives on predictive control with dual control feature for stochastic systems. *The AIChE Annual Meeting (Future Directions in Applied Mathematics and Numerical Analysis),* November 2016, San Francisco. **(Area Plenary)**

37. Model predictive control of cold atmospheric plasmas. *Process and Energy Laboratory, Delft University of Technology*, October 2016, Delft. **(Invited)**

36. Advanced control of non-equilibrium plasma systems. *Annual Gaseous Electronics Conference (Workshop on Electrification of the Chemical Industry)*, October 2016, Bochum.

35. Model predictive control of atmospheric pressure plasmas for plasma medicine. *International Conference on Plasma Medicine*, September 2016, Bratislava. **(Invited)**

34. Model predictive control of cold atmospheric plasmas. *Lam Research Visit*, August 2016, Berkeley.

33. Stochastic nonlinear model predictive control with joint chance constraints. *IFAC Symposium on Nonlinear Control Systems (NOLCOS)*, August 2016, Monterey (CA).

32. A probabilistic approach to robust experiment design for simultaneous model discrimination and parameter estimation. *The AIChE Annual Meeting*, November 2015, Salt Lake City.

31. Stochastic mode predictive control with bounded inputs and joint state chance constraints: Application to a continuous acetone-butanol-ethanol fermentation process. *The AIChE Annual Meeting*, November 2015, Salt Lake City.

30. Output feedback Lyapunov-based stochastic nonlinear model predictive control. *The AIChE Annual Meeting*, November 2015, Salt Lake City.

29. A probabilistic approach for robust optimal experiment design with chance constraints. *IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM)*, June 2015, Whistler.

28. Stochastic model predictive control of high-dimensional systems: An end-to-end continuous pharmaceutical manufacturing case study. *The AIChE Annual Meeting*, November 2014, Atlanta.

27. Stochastic output feedback control of nonlinear systems with probabilistic uncertainties: Application to control of polymorphic transformations in batch crystallization. *The AIChE Annual Meeting*, November 2014, Atlanta.

26. Advanced control of chemical and biological systems. *Model Predictive Control Laboratory*, September 2014, Berkeley.

25. Industrial nonlinear model predictive control. *Department of Electrical, Computer, and Biomedical Engineering, University of Pavia*, May 2014, Pavia. **(Invited)**

24. Advanced control of complex systems. *Department of Chemical Engineering, McMaster University*, March 2014, Hamilton.

23. Design of multi-objective failure-tolerant control systems for infinite-dimensional systems. *IEEE Conference on Decision and Control*, December 2013, Florence.

22. Nonlinear model-based control of thin-film drying for continuous pharmaceutical manufacturing. *The AIChE Annual Meeting*, November 2013, San Francisco.

21. Plant-wide control of a continuous pharmaceutical manufacturing process. *The AIChE Annual Meeting*, November 2013, San Francisco.

20. Nonlinear model predictive control for a continuous pharmaceutical manufacturing system: A comparison of control strategies for a thin-film formation process. *Process Systems Engineering Consortium Meeting*, June 2013, Cambridge.

19. Plant-wide model predictive control of a continuous pharmaceutical manufacturing pilot plant. *Novartis-MIT Center for Continuous Manufacturing*, April 2013, Cambridge.

18. Nonlinear model predictive control of a thin-film manufacturing process. *Process Systems Engineering Laboratory-MIT*, April 2013, Cambridge.

17. Closed-loop performance diagnosis using prediction error identification. *IEEE Conference on Decision and Control*, December 2011, Orlando.

16. Least-costly experiment design for closed-loop performance diagnosis. *School of Electrical Engineering, Royal Institute of Technology (KTH)*, November 2011, Stockholm.

15. Least intrusive closed-loop performance diagnosis. *The Workshop of European Research Network on System Identification*, September 2011, Nice.

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