

MOO SUN HONG

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EDUCATION

Massachusetts Institute of Technology, Ph.D., Chemical Engineering, 2021

- Thesis: Model-based Design and Control of Biopharmaceutical Manufacturing Processes
- Advisor: Prof. Richard D. Braatz

Massachusetts Institute of Technology, M.S., Chemical Engineering Practice, 2017

Seoul National University, B.S., Chemical and Biological Engineering, 2014

PROFESSIONAL EXPERIENCE

Assistant Professor, Chemical and Biological Engineering, SNU, Seoul, Korea, 2023–date

Postdoctoral Associate, Chemical Engineering, MIT, Cambridge, MA, 2021–2023

Research Assistant, Chemical Engineering, MIT, Cambridge, MA, 2014–2021

Graduate Consultant, Food and Drug Administration, Silver Spring, MD, 2016

Graduate Consultant, Emirates Global Aluminum, Dubai, United Arab Emirates, 2015

TEACHING EXPERIENCE

Instructor, Chemical and Biological Engineering, SNU, Seoul, Korea, 2023–date

- Process and Product Design (458.401, Undergraduate Level, Spring 2023)

Grad Teaching Development Tracks, Teaching + Learning Lab, MIT, Cambridge, MA, 2020–2021

- Teaching Certificate pathway for MIT graduate students

Teaching Assistant, Chemical Engineering, MIT, Cambridge, MA, 2019

- Systems Engineering (10.551, Graduate Level, Spring 2019)

HONORS AND AWARDS

Integrated Continuous Biomanufacturing V Outstanding Poster Presentation Award, ECI, 2022

PD2M Award for Excellence in Integrated QbD Practice, AIChE, 2021

Separations Division Graduate Student Research Award, AIChE, 2021

CAST Directors' Student Presentation Awards Finalist, AIChE, 2021

Modeling, Control, and Optimization of Manufacturing Systems Session Best Presentation, AIChE, 2019

Food, Pharmaceutical & Bioengineering Division Poster Presentation Award, AIChE, 2019

Dow Travel Award, Dow Chemical Company, 2018

Hanwha Travel Award, Hanwha Chemical & Hanwha Total, 2018

Jefferson W. Tester Award, School of Chemical Engineering Practice, MIT, 2016

Overseas Ph.D. Scholarship (\$50K/yr), ILJU Academy and Culture Foundation, 2014–2018

Graduated First in Class, College of Engineering, SNU, 2014

Presidential Science Scholarship, Ministry of Science and Technology, 2008–2014

† Equal contribution; * Corresponding author.

Journal Papers

- [1] G. Tian, S. L. Lee, X. Yang, **M. S. Hong**, Z. Gu, S. Li, R. Fisher, and T. F. O'Connor*. A dimensionless analysis of residence time distributions for continuous powder mixing. *Powder Technology*, 315:332-338, 2017.
<https://doi.org/10.1016/j.powtec.2017.04.007>
- [2] **M. S. Hong**, K. A. Severson, M. Jiang, A. E. Lu, J. C. Love, and R. D. Braatz*. Challenges and opportunities in biopharmaceutical manufacturing control. *Computers & Chemical Engineering*, 110:106-114, 2018.
<https://doi.org/10.1016/j.compchemeng.2017.12.007>
- [3] **M. S. Hong**, W. Sun, A. E. Lu, and R. D. Braatz*. Process analytical technology and digital biomanufacturing of monoclonal antibodies. *American Pharmaceutical Review*, 23(6):122-125, 2020 (invited).
- [4] **M. S. Hong** and R. D. Braatz*. Mechanistic modeling and parameter-adaptive nonlinear model predictive control of a microbioreactor. *Computers & Chemical Engineering*, 147:107255, 2021.
<https://doi.org/10.1016/j.compchemeng.2021.107255>
- [5] **M. S. Hong**, M. L. Velez-Suberbie, A. J. Maloney, A. Biedermann, K. R. Love, J. C. Love, T. K. Mukhopadhyay, and R. D. Braatz*. Macroscopic modeling of bioreactors for recombinant protein producing *Pichia pastoris* in defined medium. *Biotechnology & Bioengineering*, 118(3):1199-1212, 2021. <https://doi.org/10.1002/bit.27643>
- [6] **M. S. Hong**, K. Kaur, N. Sawant, S. B. Joshi, D. B. Volkin, and R. D. Braatz*. Crystallization of a non-replicating rotavirus vaccine candidate. *Biotechnology & Bioengineering*, 118(4):1750-1756, 2021.
<https://doi.org/10.1002/bit.27699>
- [7] A. Gimpel, G. Katsikis, S. Sha, A. J. Maloney, **M. S. Hong**, T. N. T. Nguyen, J. Wolfrum, S. L. Springs, A. J. Sinskey, S. Manalis, P. W. Barone, and R. D. Braatz*. Analytical methods in support of process development for recombinant adeno-associated virus-based gene therapy. *Molecular Therapy — Methods & Clinical Development*, 20:740-754, 2021. <https://doi.org/10.1016/j.omtm.2021.02.010>
- [8] N. J. Mozdierz†, Y. Lee†, **M. S. Hong**†, M. H. P. Benisch, M. L. Rasche, U. E. Tropp, M. Jiang, A. S. Myerson, and R. D. Braatz*. Mathematical modeling and experimental validation of continuous slug-flow tubular crystallization with ultrasonication-induced nucleation and spatially varying temperature. *Chemical Engineering Research and Design*, 169:275-287, 2021. <https://doi.org/10.1016/j.cherd.2021.03.026>
- [9] T. N. T. Nguyen, S. Sha, **M. S. Hong**, A. J. Maloney, P. W. Barone, C. Neufeld, J. Wolfrum, S. L. Springs, A. J. Sinskey, and R. D. Braatz*. Mechanistic model for production of recombinant adeno-associated virus via triple transfection of HEK293 cells. *Molecular Therapy—Methods & Clinical Development*, 21:642-655, 2021.
<https://doi.org/10.1016/j.omtm.2021.04.006>
 - Featured on the cover
- [10] **M. S. Hong**†, A. E. Lu†, R. W. Ou, J. Wolfrum, S. L. Spring, A. J. Sinskey, and R. D. Braatz*. Model-based control for column-based continuous viral inactivation of biopharmaceuticals. *Biotechnology & Bioengineering*, 118(8): 3215–3224, 2021. <https://doi.org/10.1002/bit.27846>
 - Featured in *Genetic Engineering & Biotechnology News*, 40(S6):S13-S15, 2020.
<https://doi.org/10.1089/gen.40.S6.05>
- [11] **M. S. Hong**, A. E. Lu, A. J. Maloney, R. W. Ou, J. M. Wolfrum, S. L. Springs, A. J. Sinskey, and R. D. Braatz*. Applying PAT to the continuous digital biomanufacturing of monoclonal antibodies. *Pharma Focus Asia*, 44:42-46, 2021 (invited).
- [12] N. J. Mozdierz, **M. S. Hong**, Y. Lee, M. Jiang, A. S. Myerson, and R. D. Braatz*. Tunable protein crystal size distribution via continuous slug-flow crystallization with spatially varying temperature. *CrystEngComm*, 23(37):6495-6505, 2021. <https://doi.org/10.1039/D1CE00387A>
 - Featured on the cover
- [13] **M. S. Hong**, A. E. Lu, J. Bae, J. M. Lee, and R. D. Braatz*. A droplet-based evaporative system for the estimation of protein crystallization kinetics. *Crystal Growth & Design*, 21(11):6064-6075, 2021.
<https://doi.org/10.1021/acs.cgd.1c00231>

- [14] P. R. Jeon, **M. S. Hong**, and R. D. Braatz*. Compact neural network modeling of nonlinear dynamical systems via the standard nonlinear operator form. *Computers & Chemical Engineering*, 159:107674, 2022. <https://doi.org/10.1016/j.compchemeng.2022.107674>
- [15] A. Nikolakopoulou†, **M. S. Hong**†, and R. D. Braatz*. Dynamic state feedback controller and observer design for dynamic artificial neural network models. *Automatica*, 146:110622, 2022. <https://doi.org/10.1016/j.automatica.2022.110622>
- [16] **M. S. Hong**, W. Sun, B. W. Anthony, and R. D. Braatz*. Teaching process data analytics and machine learning at MIT. *Chemical Engineering Education*, 56(4):226-230, 2022. <https://doi.org/10.18260/2-1-370.660-130947>
- [17] P. Srisuma, A. Pandit, Q. Zhang, **M. S. Hong**, J. Gamekkanda, F. Fachin, N. Moore, D. Djordjevic, M. Schwaerzler, T. Oyetunde, W. Tang, A. Myerson, G. Barbastathis, and R. D. Braatz*. Thermal imaging-based state estimation of a Stefan problem with application to cell thawing. *Computers & Chemical Engineering*, 173:108179, 2023. <https://doi.org/10.1016/j.compchemeng.2023.108179>

Proceeding Papers

- [1] **M. S. Hong**, K. A. Severson, M. Jiang, A. E. Lu, J. C. Love, and R. D. Braatz. Challenges and opportunities in biopharmaceutical manufacturing control, Sessions on Grand Challenges. *Proceedings of the Foundations of Computer Aided Process Operations / Chemical Process Control*, Paper 117, 2017.
- [2] A. Nikolakopoulou, **M. S. Hong**, and R. D. Braatz. Feedback control of dynamic artificial neural networks using linear matrix inequalities. *Proceedings of the IEEE Conference on Decision and Control*, 2210-2215, 2020. <https://doi.org/10.1109/CDC42340.2020.9303770>
- [3] A. Nikolakopoulou, **M. S. Hong**, and R. D. Braatz. Output feedback control and estimation of dynamic artificial neural networks using linear matrix inequalities. *Proceedings of the American Control Conference*, 2613-2618, 2021. <https://doi.org/10.23919/ACC50511.2021.9483286>

Meeting Abstracts

- [1] H. S. Woo, **M. S. Hong**, S. Shin, T. J. Yoon, and Y.-W. Lee. Regeneration of fatty acid adsorbed γ -alumina using supercritical methanol. *International Symposium on Supercritical Fluids*, Seoul, Korea, October 11–14, 2015. Abstract L-109.
- [2] G. Tian, X. Yang, S. Lee, R. Fisher, S. Li, **M. S. Hong**, Z. Gu, and T. O'Connor. A novel analysis of residence time distributions for continuous powder mixing. *AIChE Annual Meeting*, San Francisco, CA, November 13–18, 2016. Abstract 342g.
- [3] **M. S. Hong** and R. D. Braatz. Mechanistic modeling and parameter-adaptive nonlinear model predictive control of a microbioreactor. *AIChE Annual Meeting*, Pittsburg, PA, October 28–November 1, 2018. Abstract 667e.
- [4] Y. Lee, N. J. Mozdziejcz, **M. S. Hong**, R. D. Braatz, and W. B. Lee. Mathematical modeling and parameter estimation of continuous tubular crystallizer. *KIChE Spring Meeting*, Jeju, Korea, April 24–26, 2019. Abstract 174.
- [5] **M. S. Hong**, A. E. Lu, and R. D. Braatz. A systematic model-based approach for the design and control of protein crystallization. *AIChE Annual Meeting*, Orlando, FL, November 10–15, 2019. Abstract 29d.
- [6] **M. S. Hong**, M. L. Velez-Suberbie, A. J. Maloney, A. Biedermann, K. R. Love, J. C. Love, T. K. Mukhopadhyay, and R. D. Braatz. Macroscopic modeling of bioreactors for recombinant protein producing *Pichia pastoris* in defined medium. *AIChE Annual Meeting*, Orlando, FL, November 10–15, 2019. Abstract 175am.
- [7] **M. S. Hong**, A. E. Lu, J. Bae, J. M. Lee, and R. D. Braatz. A droplet-based evaporative crystallization system for protein crystallization Kinetics Estimation. *AIChE Annual Meeting*, Orlando, FL, November 10–15, 2019. Abstract 558cd.
- [8] **M. S. Hong** and R. D. Braatz. Optimal design and control of advanced biomanufacturing systems. *AIChE Annual Meeting*, San Francisco, CA (virtual), November 15–20, 2020. Abstract 3ci.
- [9] E. M. Cummings Bende, A. J. Maloney, D. Bozinovski, J. Sangerman, A. E. Lu, **M. S. Hong**, N. Persits, A. Artamonova, R. W. Ou, W. Sun, J. Wolfrum, P. W. Barone, R. J. Ram, S. Spring, R. D. Braatz, and A. J. Sinskey. Process development, characterization, and understanding in an integrated continuous monoclonal antibody manufacturing testbed. *AIChE Annual Meeting*, San Francisco, CA (virtual), November 15–20, 2020. Abstract 8e.

- [10] A. Gimpel, G. Katsikis, S. Sha, A. J. Maloney, **M. S. Hong**, T. Nguyen, J. Wolfrum, S. Springs, A. J. Sinskey, S. Manalis, P. W. Barone, and R. D. Braatz. Process analytical technologies for recombinant adeno-associated virus-based gene therapy. *AIChE Annual Meeting*, San Francisco, CA (virtual), November 15–20, 2020. Abstract 157aa.
- [11] **M. S. Hong**, A. E. Lu, and R. D. Braatz. Digitalization of biopharmaceutical manufacturing. *AIChE Annual Meeting*, San Francisco, CA (virtual), November 15–20, 2020. Abstract 195e.
- [12] A. J. Maloney, E. M. Cummings Bende, D. Bozinovski, A. E. Lu, J. Sangerman, **M. S. Hong**, A. Artamonova, R. W. Ou, W. Sun, N. Persits, R. J. Ram, J. Wolfrum, P. W. Barone, S. Spring, A. J. Sinskey, and R. D. Braatz. Process control strategy development for an integrated continuous platform for monoclonal antibody manufacturing. *AIChE Annual Meeting*, San Francisco, CA (virtual), November 15–20, 2020. Abstract 367d.
- [13] **M. S. Hong**, A. E. Lu, A. J. Maloney, E. M. Cummings Bende, D. Bozinovski, J. Sangerman, A. Artamonova, R. W. Ou, P. W. Barone, J. Wolfrum, S. Spring, A. J. Sinskey, and R. D. Braatz. First-principles dynamic simulation of an integrated continuous biomanufacturing platform. *AIChE Annual Meeting*, San Francisco, CA (virtual), November 15–20, 2020. Abstract 542e.
- [14] **M. S. Hong**. Optimal design and control of advanced biomanufacturing systems. *AIChE Annual Meeting*, Boston, MA, November 7–11, 2021. Abstract 4fl.
- [15] **M. S. Hong**, A. E. Lu, J. Bae, J. M. Lee, and R. D. Braatz. Design and control of novel droplet-based system for estimating protein crystallization kinetics. *AIChE Annual Meeting*, Boston, MA, November 7–11, 2021. Abstract 182a.
- [16] W. Sun, F. Mohr, P. R. Jeon, **M. S. Hong**, and R. D. Braatz. Smart process analytics and machine learning. *AIChE Annual Meeting*, Boston, MA, November 7–11, 2021. Abstract 259e.
- [17] D. M. Bozinovski, E. M. Cummings Bende, A. J. Maloney, J. Sangerman, A. B. Dubs, A. E. Lu, **M. S. Hong**, N. Persits, A. Artamonova, R. W. Ou, W. Sun, J. Wolfrum, P. W. Barone, R. J. Ram, S. L. Spring, R. D. Braatz, and A. J. Sinskey. Biomanufacturing and testbed development for the continuous production of monoclonal antibodies. *AIChE Annual Meeting*, Boston, MA, November 7–11, 2021. Abstract 293c.
- [18] **M. S. Hong**, A. E. Lu, R. W. Ou, J. Wolfrum, S. L. Spring, A. J. Sinskey, and R. D. Braatz. Model-based control for column-based continuous viral inactivation of biopharmaceuticals. *AIChE Annual Meeting*, Boston, MA, November 7–11, 2021. Abstract 493c.
- [19] R. D. Braatz, **M. S. Hong**, A. E. Lu, and W. Sun. Keynote talk: Integrated quality by design in (bio)pharmaceutical manufacturing. *AIChE Annual Meeting*, Boston, MA, November 7–11, 2021. Abstract 541d.
- [20] **M. S. Hong** and R. D. Braatz. Process modeling and control of digital biopharmaceutical manufacturing. *AIChE Annual Meeting*, Boston, MA, November 7–11, 2021. Abstract 584a.
- [21] T. N. T. Nguyen, S. Sha, J. Sangerman, **M. S. Hong**, J. Ng, P. W. Barone, C. Neufeld, J. Wolfrum, S. L. Springs, A. J. Sinskey, and R. D. Braatz. *ACS Spring*, San Diego, CA, March 20–24, 2022. Abstract #3652485.
- [22] **M. S. Hong**, A. E. Lu, and R. D. Braatz. Plug-and-play software for mechanistic modelling of end-to-end continuous manufacturing of monoclonal antibodies. *ACS Spring*, San Diego, CA, March 20–24, 2022. Abstract #3653870.
- [23] D. M. Bozinovski, E. M. Cummings Bende, A. J. Maloney, J. Sangerman, A. Dubs, A. E. Lu, **M. S. Hong**, A. Artamonova, R. W. Ou, W. Sun, J. Wolfrum, P. W. Barone, S. L. Springs, R. D. Braatz, and A. J. Sinskey. *ACS Spring*, San Diego, CA, March 20–24, 2022. Abstract #3661909.
- [24] S. H. Kim, **M. S. Hong**, J. H. Lee, and R. D. Braatz. Multiscale computational fluid dynamics method for slug flow reactor simulation. *AIChE Annual Meeting*, Phoenix, AZ, November 13–18, 2022. Abstract 206g.
- [25] **M. S. Hong**, A. E. Lu, and R. D. Braatz. Plug-and-play software for mechanistic modelling of end-to-end continuous manufacturing of monoclonal antibodies. *AIChE Annual Meeting*, Phoenix, AZ, November 13–18, 2022. Abstract 411a.
- [26] **M. S. Hong**, F. Mohr, C. Castro, T. Mistretta, R. A. Hart, B. Smith, and R. D. Braatz. Smart process analytics for the prediction of critical quality attributes in end-to-end batch manufacturing of monoclonal antibodies. *AIChE Annual Meeting*, Phoenix, AZ, November 13–18, 2022. Abstract 567e.

PRESENTATIONS

Oral Presentations

- [1] **M. S. Hong** and R. D. Braatz. Model-based design and control of biopharmaceutical manufacturing processes. *Emerging Junior Investigator Open Innovation Forum, AIChE Annual Meeting*, Pittsburg, PA, October 31, 2018.
- [2] **M. S. Hong** and R. D. Braatz. Mechanistic modeling and parameter-adaptive nonlinear model predictive control of a microbioreactor. *Pharmaceutical Discovery, Development & Manufacturing Forum, AIChE Annual Meeting*, Pittsburg, PA, November 1, 2018.
- [3] **M. S. Hong**, A. E. Lu, and R. D. Braatz. A systematic model-based approach for the design and control of protein crystallization. *Computing & Systems Technology Division, AIChE Annual Meeting*, Orlando, FL, November 10, 2019. **Session Best Presentation.**
- [4] **M. S. Hong**. Macroscopic modeling of bioreactors for recombinant protein producing *Pichia pastoris* in defined medium. *LabRoots Bioprocessing Virtual Event*, April 8, 2020 (invited).
- [5] **M. S. Hong**. Model-based control for continuous viral inactivation of biopharmaceuticals. *BioProcess International Europe Conference & Exhibition*, Amsterdam, Netherlands (virtual), July 14, 2020 (invited).
- [6] **M. S. Hong**. A case study in continuous digital biomanufacturing of monoclonal antibodies. *Continuous Processing in Biopharm Manufacturing, The Bioprocessing Summit*, Boston, MA (virtual), August 25, 2020 (invited).
- [7] **M. S. Hong**. A case study in continuous digital biomanufacturing of monoclonal antibodies. *Process Characterization & Control, The Bioprocessing Summit*, Boston, MA (virtual), August 28, 2020 (invited).
- [8] **M. S. Hong**. A case study in applying PAT to the continuous biomanufacturing of monoclonal antibodies. *BioProcess International Conference & Exhibition*, Boston, MA (virtual), September 23, 2020 (invited).
- [9] **M. S. Hong**, A. E. Lu, A. J. Maloney, E. M. Cummings Bende, D. Bozinovski, J. Sangerman, A. Artamonova, R. W. Ou, P. W. Barone, J. Wolfrum, S. Spring, A. J. Sinskey, and R. D. Braatz. First-principles dynamic simulation of an integrated continuous biomanufacturing platform. *Pharmaceutical Discovery, Development & Manufacturing Forum, AIChE Annual Meeting*, San Francisco, CA (virtual), November 18, 2020.
- [10] **M. S. Hong**, A. E. Lu, and R. D. Braatz. Digitalization of biopharmaceutical manufacturing. *Next-Gen Manufacturing, AIChE Annual Meeting*, San Francisco, CA (virtual), November 20, 2020.
- [11] **M. S. Hong**, A. J. Maloney, F. Mohr, and R. D. Braatz. Modeling and control on a monoclonal antibody biomanufacturing testbed. *Biomanufacturing@MIT-CBI Research Seminar Series*, January 27, 2021 (invited).
- [12] **M. S. Hong**. Building a control system pipeline for biopharmaceutical viral inactivation. *MIT Machine Intelligence for Manufacturing and Operations Student Research Forum*, March 4, 2021 (invited).
- [13] **M. S. Hong**. Model-based control for continuous viral inactivation of biopharmaceuticals. *LabRoots Bioprocessing Virtual Event*, April 7, 2021 (invited).
- [14] **M. S. Hong**. Mechanistic modeling and parameter-adaptive nonlinear model predictive control of a microbioreactor. *Bioproduction: Scale, Bioreactors & Digitalization, The Bioprocessing Summit*, Boston, MA, August 19, 2021 (invited).
- [15] **M. S. Hong**, A. E. Lu, J. Bae, J. M. Lee, and R. D. Braatz. Design and control of novel droplet-based system for estimating protein crystallization kinetics. *Computing & Systems Technology Division, AIChE Annual Meeting*, Boston, MA, November 8, 2021.
- [16] **M. S. Hong**, A. E. Lu, R. W. Ou, J. Wolfrum, S. L. Spring, A. J. Sinskey, and R. D. Braatz. Model-based control for column-based continuous viral inactivation of biopharmaceuticals. *Separations Division, AIChE Annual Meeting*, Boston, MA, November 10, 2021.
- [17] **M. S. Hong** and R. D. Braatz. Process modeling and control of digital biopharmaceutical manufacturing. *Pharmaceutical Discovery, Development & Manufacturing Forum, AIChE Annual Meeting*, Boston, MA, November 11, 2021.
- [18] **M. S. Hong**. Model-based design and control of biopharmaceutical manufacturing processes. *Young Researcher Symposium, SNU School of Chemical and Biological Engineering*, Seoul, Korea (virtual), January 6, 2022.

- [19] **M. S. Hong.** Process modeling and control of digital biopharmaceutical manufacturing. *Process Control, Optimization, and Data Analytics Young Researcher Online Seminar Series, IEEE CSS TC on Process Control*, January 26, 2022.
- [20] **M. S. Hong.** Process modeling and control of digital biopharmaceutical manufacturing. *Smart Digital Engineering Professionals Training Course, SNU Engineering Development Research Center*, Seoul, Korea (virtual), February 15, 2022.
- [21] **M. S. Hong**, A. E. Lu, and R. D. Braatz. Plug-and-play software for mechanistic modelling of end-to-end continuous manufacturing of monoclonal antibodies. *Division of Biochemical Technology, ACS Spring*, San Diego, CA, March 22, 2022.
- [22] **M. S. Hong.** Biological validation of column-based continuous viral inactivation. *BioProcess International Europe Conference & Exhibition*, Vienna, Austria, May 18, 2022 (invited).
- [23] **M. S. Hong**, A. E. Lu, and R. D. Braatz. Plug-and-play software for mechanistic modelling of end-to-end continuous manufacturing of monoclonal antibodies. *Pharmaceutical Discovery, Development & Manufacturing Forum, AIChE Annual Meeting*, Phoenix, AZ, November 15, 2022.
- [24] **M. S. Hong**, F. Mohr, C. Castro, T. Mistretta, R. A. Hart, B. Smith, and R. D. Braatz. Smart process analytics for the prediction of critical quality attributes in end-to-end batch manufacturing of monoclonal antibodies. *Pharmaceutical Discovery, Development & Manufacturing Forum, AIChE Annual Meeting*, Phoenix, AZ, November 16, 2022.
- [25] **M. S. Hong**, J. Rhyu, P. Seber, and R. D. Braatz. Advances in process analytics. *Cytiva/Pall Corp-MIT: Virtual Presentation*, November 18, 2022 (invited).

Poster Presentations

- [1] **M. S. Hong** and R. D. Braatz. Mechanistic modeling and parameter-adaptive nonlinear model predictive control of a microbioreactor. *BioMAN Summit: Driving Innovation in Cell and Gene Therapy Manufacturing*, Cambridge, MA, December 11, 2018.
- [2] **M. S. Hong**, N. J. Mozdierz, M. Jiang, and R. D. Braatz. Improving biopharmaceutical stability and minimizing cold-chain burden using continuous protein crystallization. *Joint FAU–MIT Workshop: The Design of Particulate Products by Continuous Processes*, Cambridge, MA, April 5, 2019.
- [3] **M. S. Hong**, M. L. Velez-Suberbie, A. J. Maloney, A. Biedermann, K. R. Love, J. C. Love, T. K. Mukhopadhyay, and R. D. Braatz. Macroscopic modeling of bioreactors for recombinant protein producing *Pichia pastoris* in defined medium. *Food, Pharmaceutical & Bioengineering Division, AIChE Annual Meeting*, Orlando, FL, November 11, 2019. **Division Poster Award.**
- [4] **M. S. Hong**, A. E. Lu, J. Bae, J. M. Lee, and R. D. Braatz. A droplet-based evaporative crystallization system for protein crystallization kinetics estimation. *General Poster Session, AIChE Annual Meeting*, Orlando, FL, November 13, 2019.
- [5] **M. S. Hong** and R. D. Braatz. Optimal design and control of advanced biomanufacturing systems. *Meet the Faculty Candidates Poster Session, AIChE Annual Meeting*, San Francisco, CA (virtual), November 16, 2020.
- [6] **M. S. Hong**, A. E. Lu, R. W. Ou, J. Wolfrum, S. L. Spring, A. J. Sinskey, and R. D. Braatz. Model-based control for continuous viral inactivation of biopharmaceuticals. *BioMAN Spring Workshop: Data Analytics along the Biomanufacturing Life Cycle*, May 19, 2021.
- [7] **M. S. Hong.** Optimal design and control of advanced biomanufacturing systems. *Meet the Faculty Candidates Poster Session, AIChE Annual Meeting*, Boston, MA, November 7, 2021.
- [8] **M. S. Hong**, A. E. Lu, and R. D. Braatz. Plug-and-play software for mechanistic modelling of end-to-end continuous manufacturing of monoclonal antibodies. *Integrated Continuous Biomanufacturing V*, Sitges, Spain, October 10, 2022.

SERVICE TO DISCIPLINARY AND PROFESSIONAL SOCIETIES

Korean Institute of Chemical Engineers (KIChE)

- Member, 2014–date

American Institute of Chemical Engineers (AIChE)

- Member, 2018–date
- Judge, Undergraduate Poster Competition, *AIChE Annual Meeting*, Boston, MA, November 8, 2021
- Judge, Division 15 Poster Competition, *AIChE Annual Meeting*, Boston, MA, November 8, 2021
- Co-chair for Session on Crystallization in Process Development, *AIChE Annual Meeting*, Phoenix, AZ, November 16, 2022

International Federation of Automatic Control (IFAC)

- Affiliate, 2020–date
- Technical Committee on Distributed Parameter Systems (TC 2.6), 2020–date
- Technical Committee on Chemical Process Control (TC 6.1), 2021–date
- Technical Committee on Biological and Medical Systems (TC 8.2), 2021–date

American Chemical Society (ACS)

- Member, 2022–date
- Biochemical Technology (BIOT) Division, 2022–date

Miscellaneous Chairs/Organization

- Scientific Advisory Board, *The Bioprocessing Summit*, Boston, MA, August 15–18, 2022

Reviewer for

- Automatica
- American Control Conference
- IEEE Conference on Decision and Control
- Journal of Process Control
- IFAC World Congress