Curriculum Vitae

Hamid R. Ossareh
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EDUCATION

- ***Ph.D.*** **in Electrical Engineering** **2013**
  University of Michigan, Ann Arbor, MI
  Research Advisors: Pierre Kabamba, and Semyon Meerkov
  Dissertation: Quasilinear Control Theory for Systems with Asymmetric Actuators and Sensors
- ***M.S.*** **in Mathematics** **2012**
  University of Michigan, Ann Arbor, MI
- ***M.S.E.*** **in Electrical Engineering** **2010**
  University of Michigan, Ann Arbor, MI
- ***B.A.Sc*** **in Electrical Engineering** **2008**
  University of Toronto, Toronto, ON
  Cumulative GPA: 3.94/4.00

PROFESSIONAL EXPERIENCE

- **Beta Technologies, Burlington, VT** **2020–Present**
  Technical Consultant
- **University of Vermont, Burlington, VT** **2016–Present**
  Assistant Professor – Department of Electrical and Biomedical Engineering
- **Ford Motor Company, Dearborn, MI** **2013–2016**
  Research engineer – Ford Research and Advanced Engineering
- **UQurate, Ann Arbor, MI** **2014**
  Executive Vice President of Mobile Applications
- **University of Michigan, Ann Arbor, MI** **2008–2013**
  Research Assistant
- **University of Toronto, Toronto, ON** **2006-2008**
  Undergraduate Research Assistant

RESEARCH INTERESTS

Systems and control theory; Constraint-aware control; Predictive control; Stochastic Linearization; Modeling and control of automotive, power, and aerospace systems.

TEACHING EXPERIENCE

- **University of Vermont, Burlington, VT** **2016-Present**
  EE 314: Nonlinear Systems Theory (Graduate, Spring 2019)
  EE 171: Signals and Systems (Junior level, Fall 2016, Fall 2018)
  EE 110: Control Systems (Junior/Senior level, Spring 2020, Spring 2019, Spring 2018, Spring 2017)
  EE 211: Real-time control Systems (Senior/graduate level, Fall 2017, Fall 2019, Fall 2020)

- **Upward Bound Program, Burlington, VT** **2018**
  Instructor for a course on "Teaching Through Technologies" for high school students of Burlington and surrounding areas.
- **Ford Motor Company, Dearborn, MI** **2014**
  Instructor for a course on control of systems with saturating actuators.
- **University of Michigan, Ann Arbor, MI** **2011-2012**
  Graduate Student Instructor for EECS 560: Graduate course in Linear Systems Theory and Design. Received the best teaching assistant award.

REFEREED JOURNAL PUBLICATIONS

Main contributer and/or main student researcher denoted by †. Student advisees are underlined.

J1. Sarnaduti Brahma†, Adil Khurram, **Hamid Ossareh**, and Mads Almassalkhi. "Optimal Frequency Regulation using Packetized Energy Management." Submitted to *the IEEE Transactions on Smart Grid.*

J2. C. Freiheit†, D. Anand, **H. R. Ossareh**. "Parametrized Maximal Admissible Sets with Application to Constraint Management of Systems with Slowly Varying Parameters". Submitted to the *International Journal of Control.*

J3. M. Foroutan†, A. Ghazanfari†, **H. R. Ossareh**, E. Ghazanfari. "Intelligent Compaction: Evaluation of Compaction's Consistency and Uniformity Improvement in a Reclaimed Stabilized Base Project." Submitted to the *Journal of Automation in Construction.*

J4. J. Osorio†, M. Santillo, M. Jankovic, J. Buckland, **H. R. Ossareh**. "A Novel Reference Governor Approach for Constraint Management of Nonlinear Systems". Submitted to *Automatica.* First revision submitted.

J5. S. Brahma†, **H. R. Ossareh**. "Stochastic Linearization of Feedback Systems with Multivariate Nonlinearities and Systems with State Multiplicative Noise". *IEEE Transactions on Automatic Control.* Accepted for publication.

J6. Y. Liu†, J. Osorio, **H. R. Ossareh**. "Decoupled Reference Governors: A Constraint Management Technique for MIMO Systems." *International Journal of Control.* Accepted for publication.

J7. J. Lee†, **H. R. Ossareh**, Y. Eun. "Analyzing Noise-Induced Tracking Errors in Control Systems with Saturation: A Stochastic Linearization Approach." *Journal of Franklin Institute.* 2021.

J8. S. Brahma†, T. Foley, S. Wisotzki, **H. R. Ossareh**, "An Investigation into Accuracy, Computation, and Robustness of Stochastic Linearization of Systems with Saturation Nonlinearities". *Results in Control and Optimization.* 2021.

J9. Y. Liu†, **H. R. Ossareh**. "Preview Reference Governors: A Constraint Management Technique for Systems With Preview Information." Journal of *System and Control Letters.* 2021.

J10. M. Almassalkhi†, S. Brahma, N. Nazir, **H. R. Ossareh**, et. al. "Hierarchical, Grid-Aware, and Economically Optimal Coordination of Distributed Energy Resources in Realistic Distribution Systems". *Energies.* 2020.

J11. S. Brahma†, N. Nazir†, **H. R. Ossareh**, and M. Almassalkhi. "Optimal and resilient coordination of virtual batteries in distribution feeders". *IEEE Transactions on Power Systems.* 2020.

J12. C. Freiheit†, D. Anand, **H. R. Ossareh**. "Overshoot mitigation using the reference governor framework". *IEEE Control Systems Letters.* 2019

J13. **H. R. Ossareh**†, Sam Wisotzki, Julie Buckland, Mrdjan Jankovic. "A Novel IMC-based Approach for Characterization and Controller Tuning of Turbocharged Gasoline Engines". *IEEE Transactions on Control Systems Technologies.* 2019

J14. **H. R. Ossareh**†. "Reference Governors and Maximal Output Admissible Sets for Linear Periodic Systems". *International Journal of Control.* 2019

J15. P. Kabamba, S. Meerkov, **H. R. Ossareh**. "Stochastic approximation approach to design of linear controllers for tracking systems with asymmetric saturation." *ASME Transactions on Dynamic Systems, Measurement, and Control.* 2015.

J16. Y. Guo, P. Kabamba, S. Meerkov, **H. R. Ossareh**, CY. Tang. "Quasilinear Control of Wind Farm Power Output". *IEEE Transactions on Control Systems Technology.* 2015

J17. P. Kabamba, S. Meerkov, **H. R. Ossareh**. "Stochastic Linearisation Approach to Performance Analysis of Feedback Systems with Asymmetric Nonlinear Actuators and Sensors". *International Journal of Control.* 2014.

J18. P. Kabamba, S. Meerkov, **H. R. Ossareh**. "Quasilinear Control Approach to Designing Step Tracking Controllers for Systems With Saturating Actuators". *ASME Transactions on Dynamic Systems, Measurement, and Control.* 2013.

J19. Y. Eun, E. Gross, A. Menezes, P. Kabamba, S. Meerkov, **H. R. Ossareh**. "Cyclic Control: Problem Formulation and Stability Analysis". *ASME Transactions on Dynamic Systems, Measurement, and Control.* 2013.

J20. Y. Eun, E. Gross, A. Menezes, P. Kabamba, S. Meerkov, **H. R. Ossareh**. "Cyclic Control: Reference Tracking and Disturbance Rejection." *IEEE Transactions on Control Systems Technology.* 2012.

J21. **H. R. Ossareh**, A. C. Ventura, S. D. Merajver, D. Del Vecchio. "Long Signaling Cascades Tend to Attenuate Retroactivity". *Biophysical Journal.* 2011.

REFEREED CONFERENCE PUBLICATIONS

Main contributer and/or main student researcher denoted by †. Student advisees are underlined.

C1. S. Brahma†, M. R. Almassalkhi, and **H. R. Ossareh**, "Optimal Control of Virtual Batteries using Stochastic Linearization," Accepted for presentation at the *2021 IEEE Conference on Control Technology and Applications (CCTA).*

C2. J. Osorio, **H. R. Ossareh**. "Transient-Robust Reference Governors: An Extension to Systems with Non-invertible Steady-State Mappings." Accepted for presentation at the *IEEE Conference on Control Technology and Applications (CCTA).*

C3. M. Foroutan†, A. Ghazanfari, **H. R. Ossareh**, E. Ghazanfari. "Geo-statistical evaluation of the intelligent compaction performance in a reclaimed base project". *Proceedings of the 4th International Conference on Transportation Geotechnics*, Chicago, 2021

C4. Y. Liu†, J. Osorio, **H. R. Ossareh**. "Preview Reference Governors". *Proceedings of the 2021 American Control Conference (ACC).*

C5. A. Laracy†, **H. R. Ossareh**. "Constraint Management for Batch Processes Using Iterative Learning Control and Reference Governors." *Proceedings of Machine Learning Research.* 2020.

C6. S. Wisotzki†, S. Brahma, **H. R. Ossareh**. "A Novel Approach to IMC-Based Controller Tuning Using Integrator Dynamics." *IEEE Conference on Control Technology and Applications (CCTA).* 2020.

C7. S. Brahma†, **H. R. Ossareh**. "Quasilinear Control of Feedback Systems with Multivariate Nonlinearities". *Proceedings of the 2019 IEEE Conference on Decision and Control (CDC).* 2019.

C8. D. M. Anand†, C. Freiheit†, M. Weiss, K. Shenoi, **H. R. Ossareh**. "A timing impairment module for electrical synchrometrology". *IEEE International Symposium on Precision Clock Synchronization for Measurement, Control, and Communication (ISPCS).* 2019

C9. J. Osorio†, M. Santillo, J. Buckland, M. Jankovic, **H. R. Ossareh**. "A Reference Governor Approach Towards Constraint Violation Recovery." *Proceedings of the 2019 American Control Conference (ACC).*

C10. W. Huang†, S. Brahma, **H. R. Ossareh**. "Quasilinear Control of Systems with Time-Delays and Nonlinear Actuators and Sensors". *Proceedings of the the 2019 American Control Conference (ACC).*

C11. **H. R. Ossareh**†. "Constraint Management of Rotating Machinery With Application to Xerography". *Proceedings of the 2019 American Control Conference (ACC).*

C12. J. Osorio†, **H. R. Ossareh**. "A Stochastic Approach to Maximal Output Admissible Sets and Reference Governors". *Proceedings of the 2018 IEEE Conference on Control Technology and Applications (CCTA).* 2018.

C13. S. Brahma†, M. R. Almassalkhi, **H. R. Ossareh**. "A Stochastic Linearization Approach to Optimal Primary Control of Power Systems with Generator Saturation". *Proceedings of the 2018 IEEE Conference on Control Technology and Applications (CCTA).* 2018.

C14. Y. Liu†, J. Osorio, **H. R. Ossareh**. "Decoupled Reference Governors for Multi-Input Multi-Output Systems". *Proceedings of the 2018 IEEE Conference on Decision and Control (CDC).* 2018

C15. **H. R. Ossareh**†. "An LQR Theory for Systems with Asymmetric Saturating Actuators." *Proceedings of the American Control Conference (ACC).* 2016.

C16. **H. R. Ossareh**†, J. Buckland, M. Jankovic. "Continuous Compressor Recirculation to Improve Boost Response and Mitigate Compressor Surge in Turbocharged Gasoline Engines". *Proceedings of the American Control Conference (ACC).* 2016.

C17. Z. Li†, **H. R. Ossareh**, I. V. Kolmanovsky, E. M. Atkins, J. Lu. "Control Design of Semi-active Suspension Systems using a Quasi-Linear Control Approach". *Proceedings of the American Control Conference (ACC).* 2016.

C18. E. Hellstrom†, **H. R. Ossareh**, B. Xiao, M. Santillo. "Characterizing and Detecting Surge and Co-Surge in Automotive Compressors". *Proceedings of the IFAC Conference on Advances in Automotive Control.* 2016

C19. P. Kabamba, S. Meerkov, **H. R. Ossareh**†. "QLC-Based Design of Reference Tracking Controllers for Systems with Asymmetric Saturating Actuators". *Proceedings of the 52nd IEEE Conference on Decision and Control (CDC).* 2013.

C20. Y. Guo, P. Kabamba, S. Meerkov, **H. R. Ossareh**†, CY. Tang. "Quasilinear Control Approach to Wind Farm Power Control." *Proceedings of the 52nd IEEE Conference on Decision and Control (CDC).* 2013.

C21. P. Kabamba, S. Meerkov, **H. R. Ossareh**†. "A Method For Designing Step-tracking Controllers for Systems with Saturating Actuators." *Proceedings of the American Control Conference (ACC).* 2013.

C22. Y. Eun, E. Gross, A. Menezes, P. Kabamba, S. Meerkov, **H. R. Ossareh**†. "Cyclic Control: the Case of Static Output Feedback". *Proceedings of the 18th IFAC World Congress (peer reviewed).* 2011.

C23. **H. R. Ossareh**†, D. Del Vecchio. "Retroactivity Attenuation in Signaling Cascades". *Proceedings of the 50th IEEE Conference on Decision and Control (peer reviewed).* 2011. (Invited paper)

arXiv PUBLICATIONS

- Y. Liu†, J. Osorio, and **H. R. Ossareh**. "Preview reference governors." arXiv e-prints (2021): arXiv-2102.
- Y. Liu†, J. Osorio, and **H. R. Ossareh**. "Decoupled reference governors: A constraint management technique for mimo systems." arXiv preprint arXiv:2012.02020 (2020).
- S. Brahma†, N. Nazir. **H. R. Ossareh**, M. Almassalkhi. "Optimal and resilient coordination of virtual batteries in distribution feeders." arXiv preprint arXiv:2010.03063 (2020).
- C. Freiheit†, D. Anand, **H. R. Ossareh**. "A Reference Governor for Overshoot Mitigation of Tracking Control Systems". arXiv preprint arXiv:2006.13914. 2020.

- S. Brahma[†], **H. R. Ossareh**. "Stochastic Linearization of Multivariate Nonlinearities". arXiv preprint arXiv:1807.06135. 2018.
- **H. R. Ossareh**[†]. "Reference Governors and Maximal Output Admissible Sets for Linear Periodic Systems". arXiv preprint arXiv:1804.09262. 2018.

US PATENTS

1. 10,858,987 "Method and system for compressor outlet temperature regulation"
2. 10,677,145 "Method and system for boost pressure control"
3. 10,502,122 "Method and system for boost pressure control"
4. 10,273,874 "Method and system for compressor outlet temperature regulation"
5. 10,252,712 "Adapting engine-on time to driver aggressiveness in a hybrid vehicle"
6. 10,240,516 "System for wastegate control"
7. 10,208,693 "Method and system to mitigate throttle degradation"
8. 10,208,657 "Diagnostic method for a compressor recirculation valve"
9. 10,190,512 "Manifold volume determination based on surge frequency"
10. 10,167,804 "System and methods for CBV diagnostics"
11. 10,161,303 "Systems and methods for generating auxiliary torque"
12. 10,107,184 "Method and system for wastegate control"
13. 10,060,341 "Methods and systems for boost control"
14. 10,024,227 "Method and system for boost pressure control"
15. 10,024,226 "Method and system for boost pressure control"
16. 10,012,137 "Diagnostic method for a compressor recirculation valve"
17. 10,001,089 "Sludge detection and compensation for the continuously variable compressor recirculation valve"
18. 9,903,288 "Methods and system for determining compressor recirculation valve sludge"
19. 9,890,697 "Method and system for boost pressure control"
20. 9,890,691 "Method and system to reduce charge air cooler condensation"
21. 9,874,191 "Method and system for assisting engine start with a supercharger"
22. 9,850,831 "Method and system for engine speed control"
23. 9,816,447 "Methods and systems for surge control"
24. 9,810,229 "Methods and systems for detecting compressor recirculation valve faults"
25. 9,802,618 "Systems and methods for improving manual transmission shifting"
26. 9,790,849 "Method and system to operate a compressor for an engine"
27. 9,765,688 "Methods and system for controlling compressor surge"
28. 9,745,906 "Methods and system for improving compressor recirculation valve operation"
29. 9,726,092 "Methods and systems for boost control"
30. 9,702,298 "Diagnostic method for a compressor recirculation valve"
31. 9,695,740 "Methods and systems for boost control"
32. 9,677,481 "Methods and systems for boost control"
33. 9,657,660 "Method and system for surge control"
34. 9,631,564 "Methods and system for determining compressor recirculation valve sludge"
35. 9,551,276 "Methods and systems for surge control"

36. 9,528,430 "Methods and system for compensating compressor recirculation sludge"
37. 9,506,474 "Methods and systems for real-time compressor surge line adaptation"
38. 9,441,568 "System and methods for CBV diagnostics"

RESEARCH GRANTS

- "New Unified Framework for Scalable, Risk-Aware, and Resilient Estimation and Control of Satellite Swarms"
  Duration: 2020-2023
  Funding source: NASA
  Amount: $1,125,000 ($750,000 federal share, awarded)
  Role: PI
- "Adaptive Constraint-aware Control of Distributed Grid Assets: a set-theoretic framework"
  Duration: 2019-2020
  Funding source: NIST
  Amount: $99,711 (awarded)
  Role: PI
- "Real-time Capable Constraint Management Strategy with Application to EcoBoost Engines."
  Duration: 2017-2020
  Funding source: Ford Motor Company
  Amount: $150,000 (awarded)
  Role: PI
- "Constraint-aware Integrated Control of Fuel Cell Vehicles: from stack control to energy management."
  Duration: 2020-2023
  Funding source: Ford Motor Company
  Amount: $150,000 (awarded)
  Role: PI
- OVPR Express, 2017
  Funding source: University of Vermont
  Amount: $3,000 (awarded)
  Role: PI
- "Robust and resilient coordination of feeders with uncertain distributed energy resources: from real-time control to long-term planning."
  Duration: 2017-2019
  Funding source: US Department of Energy – Energise
  Amount: $2.25M (awarded)
  Role: Co-PI
- "Adaptive Constraint Managers for Aerospace Applications"
  Duration: 2019
  Funding source: NASA EPSCoR
  Amount: $15,000 (awarded)
  Role: PI
- "Packetized Energy Management: Coordinating Transmission and Distribution"
  Duration: 2019-2021
  Funding source: US Department of Energy – ARPA-E Nodes
  Amount: $1.574M (awarded)
  Role: Co-PI
- "Army Visual and Tactical Arctic Reconnaissance (AVATAR)"
  Duration: 2020-2023
  Funding source: US ARMY – CRREL

Amount: $3.7M (awarded)
Role: Co-PI

- "Enhancing intelligent compaction with passive wireless sensors"
  Duration: 2018-2020
  Funding source: US Department of Transportation, Transportation Infrastructure Durability Center Contribution
  Amount: $254,931 (awarded)
  Role: Co-PI
- "Communications, Control, Cybersecurity and Electromagnetic Sensing Research for Navy ROTC" (Training grant)
  Duration: 2021-2022
  Funding source: US Navy
  Amount: $204,388 (awarded)
  Role: Co-PI

RESEARCH ADVISING

Current:

- Dr. Himadri Basu, Postdoctoral Associate
- Mostafa Ali Ayubi Rad, PhD student (prospective)
- Najmeh Movahhed Neya, PhD student (prospective)
- Yasaman Pedari, PhD student
- Sarnaduti Brahma, PhD student
- Yudan Liu, PhD student
- Eli Bacher-Chong, MS student
- Ahmad Ghazanfari, MS student
- Thomas Wright, Undergraduate student (REU)
- Vanessa Tran, Undergraduate student (REU)
- Molly Ramirez, Unidergraduate student (REU)

Past:

- Joycer Osorio, PhD student
- Collin Freiheit, MS student
- Aidan Laracy, MS student
- Weiping Huang, MS student
- Sam Wisotzki, MS student
- Chujun Chen, MS student
- Yungchih Hsu, MS student
- Atreyu Spencer, MS student
- Tim Foley, Undergraduate student
- Dylan Burns, Undergraduate student
- Abdoulaye Ira, Undergraduate student
- Goerge Spearing, Undergraduate student
- Adam Farrington, Undergraduate student

HONORS AND AWARDS

- Excellence in Research Award, CEMS, University of Vermont, 2021.
- Faculty of the year award, IEEE GMS, 2020.
- Inventor of the Year Award, IEEE GMS, 2019.
- Faculty of the year award, IEEE GMS, 2018.
- Chapter officer of the year award, IEEE GMS, 2018.
- Ford Technical Achievement Award, Ford Motor Company, 2017.
- Chief Engineer's Award, Ford Research and Advanced Engineering, 2015.
- Nominated three times, and selected as winner once, for the Towner Prize for Best Graduate Student Instructor, University of Michigan (2011, 2012, 2013).
- EECS Fellowship, University of Michigan, 2008-2013.
- NSERC Postgraduate award (PGS-D), Government of Canada, 2010-2012.
- NSERC Postgraduate award (PGS-M), Government of Canada, 2008-2010.
- Adel Sedra gold medal for outstanding academic achievement, University of Toronto, 2008.
- NSERC Undergraduate Student Research Award, Government of Canada, 2006 and 2007.
- Edward S. Rogers Sr. scholarship, University of Toronto, 2004-2008.
- Queen Elizabeth II Award, Government of Ontario, 2004-2008.
- Lau Family scholarship, University of Toronto, 2007-2008.
- Gordon Slemon scholarship, University of Toronto, 2006.

PROFESSIONAL AFFILIATIONS

- Member of the ASME Automotive and Transportation Systems (ATS) Technical Committee.
- Member of the Conference Editorial Board of IEEE CSS.
- Founding chair, IEEE GMS Control Systems Society.
- IEEE, senior member.
- ASEE, member.
- GoldenKey, member.
- Ontario Scholar.

CITIZENSHIP STATUS

- USA
- Canada