

**Samuel Rudy**  
NSF Postdoctoral Fellow  
Massachusetts Institute of Technology

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## Affiliations

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<b>Massachusetts Institute of Technology</b> (Sept. 2019 - current) NSF Mathematical Sciences Postdoctoral Fellow Sponsoring Scientist: Themistoklis Sapsis	Cambridge, MA
<b>University of Washington</b> (June 2019 - Aug. 2019) Postdoctoral Scholar (Sept. 2014 - June 2019) Ph.D. Student	Seattle, WA
<b>HERE Technologies</b> (June - Aug. 2017) Data Science Intern	Seattle, WA

## Education

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<b>University of Washington</b> M.S. in Applied Mathematics Ph.D. in Applied Mathematics Advisors: J. Nathan Kutz and Steven Brunton	Seattle, WA 2015 2019
<b>Washington University in St. Louis</b> B.A. in Mathematics and Physics (Summa Cum Laude) Budapest Semesters in Mathematics, Summer 2013	St. Louis, MO 2014

## Awards and Honors

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• NSF Mathematical Sciences Postdoctoral Fellowship	2019
• NSF Graduate Research Fellowship, Honorable Mention	2016
• University of Washington Top Scholars Fellowship	2015
• Sigma Pi Sigma Physics Honor Society	2014
• Phi Beta Kappa	2014
• Washington University Ross Middlemiss Awards in Mathematics	2014
• Budapest Semesters in Mathematics High Honors	2013

## Journal Publications

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1. **Samuel H. Rudy**, Steven L. Brunton, and J. Nathan Kutz. Smoothing and parameter estimation by soft-adherence to governing equations. *Journal of Computational Physics*. 398, 108860. 2019.
2. **Samuel H. Rudy**, J. Nathan Kutz, and Steven L. Brunton. Deep learning of dynamics and signal-noise decomposition with time-stepping constraints. *Journal of Computational Physics*. 396(1), 483-506. 2019.
3. **Samuel H. Rudy**, Alessandro Alla, Steven L. Brunton, and J. Nathan Kutz. Data-driven identification of parametric partial differential equations. *SIAM J. Appl. Dyn. Syst.*, 18(2), 643–660. 2019.
4. **Samuel H. Rudy**, Steven L. Brunton, Joshua L. Proctor, and J. Nathan Kutz. Data-driven discovery of partial differential equations. *Science Advances*, 3(4):e1602614, 2017.

5. **Samuel H. Rudy**, Pedro D. Maia, J. Nathan Kutz. Cognitive and behavioral deficits arising from neurodegeneration and traumatic brain injury: a model for the underlying role of focal axonal swellings in neuronal networks with plasticity. *Journal of Systems and Integrative Neuroscience*. 2016.

## Conference Proceedings

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1. J. Nathan Kutz, **Samuel H. Rudy**, Alessandro Alla, and Steven L. Brunton. Data-driven discovery of governing physical laws and their parametric dependencies in engineering, physics and biology. *In CAMSAP*, pages 1–5, 2017.

## Teaching

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- Instructor, UW, Applied Math 383, *Introduction to Continuous Mathematical Modeling*, Summer 2018.
- Teaching Assistant, UW
  1. Math 111, *Algebra with Applications*, Fall 2016
  2. Math 125, *Calculus with Analytic Geometry II*, Fall 2014
  3. Math 126, *Calculus with Analytic Geometry III*, Winter 2015, Fall 2015
  4. Applied Math 563, *Inferring Structure of Complex Systems*, Spring 2018
- Grader, Washington University, Math 310, *Foundations for Higher Mathematics*, Fall 2013

## Service

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- Reviewer for *Journal of Computational Physics*, *Journal of Machine Learning Research*, *Chaos*, *Physical Review Letters*, *Physical Review E* *Physical Review X*, *SIAM Journal on Applied Mathematics*, *Mechanical Systems and Signal Processing*, *Nonlinear Dynamics*, *Communications in Computational Physics* *Mathematical Geosciences*, *Conference on Mathematical and Scientific Machine Learning*.
- Session chair and Co-organizer for “Physics Motivated Problems in Machine Learning” minisymposium at 2019 SIAM Conference on Computational Science and Engineering.
- Homework Help Volunteer at Seattle Public Libraries, 2015-2019. Mentoring for 1.5 hours per week during the school year at Douglass-Truth Branch.

## Invited Talks

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1. Harvard University Fluid Dynamics Seminar (Cambridge, MA, October 2019)
2. Recent Topics in System Identification at SIAM Conference on Control and Its Applications 2019 (Chengdu China, June 2019)
3. Extreme Events in Dynamical Systems at SIAM Conference on Applications of Dynamical Systems 2019 (Snowbird UT, May 2019)
4. Physics Motivated Problems in Machine Learning at SIAM Conference on Computational Science and Engineering 2019 (Spokane WA, February 2019)
5. Machine Learning and Data Science Approaches in Ocean Acoustics at 176th meeting of the Acoustical Society of America (Victoria BC, November 2018)
6. MIT Aerospace Computational Design Lab Seminar (Cambridge MA, November 2018)
7. Brown University Division of Applied Mathematics. CRUNCH Group. (Providence RI, October 2018)
8. UC Berkeley/LBNL Applied Mathematics Seminar (Berkeley CA, October 2018)

9. Banff workshop on Data-driven methods for reduced-order modeling and stochastic PDEs (Banff Canada, January 2017)
10. “An Alternative Graph Theoretic Proof of the Amitsur-Levitski Identity”, Undergraduate Honors Thesis Presentation at Washington University in St. Louis (St. Louis MO, April 2014)

### **Contributed Talks**

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1. “Nonlinear Dynamics: Model Reduction” at 71st Annual Meeting of the APS Division of Fluid Dynamics (Atlanta GA, November 2018)
2. “Nonlinear Dynamics: Topology and Theoretical” at 69th Annual Meeting of the APS Division of Fluid Dynamics (Portland OR, November 2016)

### **Contributed Posters**

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1. Symposium on Machine Learning for Dynamical Systems, Imperial College London (London UK, February 2019)