James D. Turner

james@turner.link
https://james.turner.link

Summary

Mechanical engineering Ph.D. candidate with research and industry experience in reinforcement learning, nonlinear dynamical systems, mechanical simulation, electromechanical controls, numerical optimization, state estimation, testing and verification, data analysis, and software development.

Education

Ph.D. Mechanical Engineering: *Duke University, Durham, NC – 4.00 GPA* 2015–present

- *2017 National Defense Science & Engineering Graduate (NDSEG) Fellow:* Merit-based, national, full-ride fellowship
- *2015 James B. Duke Fellow:* Merit-based, four-year fellowship
- *2015 Pratt/Gardner Fellow:* Merit-based fellowship

B.S. Mechanical Engineering: *North Carolina State University, Raleigh, NC – Valedictorian, 4.00 GPA* 2011–2015

- *Minors:* Spanish & Computer Programming
- *2015 NCSU Mech. & Aero. Engineering Senior Award for Leadership*
- *2014 Goldwater Scholar:* Merit-based, national scholarship
- *2011 NCSU Park Scholar:* Merit-based, full-ride scholarship

Publications & Presentations

Little, J. A., J. D. Turner, and B. P. Mann. "Improving empirical characteristic multiplier estimation through a change of basis". *Journal of Sound and Vibration,* 488 (Dec. 2020).

Wang, X.-S., J. D. Turner, and B. P. Mann. "Constrained attractor selection using deep reinforcement learning". *Journal of Vibration and Control* (May 2020).

Turner, J. D., L. H. Manring, and B. P. Mann. "Reinforcement learning for active damping of harmonically excited pendulum with highly nonlinear actuator". *Nonlinear Structures and Systems, Volume 1: Proceedings of the 37th IMAC, Jan. 2019,* (2020), pp. 119–123.

Turner, J. D., M. J. Mazzoleni, J. A. Little, D. Sequeira, and B. P. Mann. "A nonlinear model for the characterization and optimization of athletic training and performance". *Biomedical Human Kinetics,* 9.1 (Feb. 2017), pp. 82–93.

Turner, J. D. and B. P. Mann. "Sensitivity of final field position to the punt initial conditions in American football". *Proceedings of the ASME 2016 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference.* Charlotte, NC, August 2016.

Turner, J. D. and Y. Zhu. "Three-dimensional structures from electrically-activated self-folding of polymer sheets". *Summer Undergraduate Research Symposium.* North Carolina State University. Raleigh, NC, July 2014.

Mack, C. M., B. J. Lin, J. D. Turner, A. F. Johnstone, L. D. Burgoon, and T. J. Shafer. "Burst and principal components analyses of MEA data for 16 chemicals describe at least three effects classes". *NeuroToxicology,* 40 (Jan. 2014), pp. 75–85.

Qin, Q., R. W. Mailen, J. D. Turner, Y. Liu, J. Genzer, M. D. Dickey, and Y. Zhu. "Self-folding of polymer sheets into origami: modeling and experiments". *SEM Annual Conference and Exposition on Experimental and Applied Mechanics.* Lombard, IL, June 2013.

Work & Research Experience

Duke University, Dept. of Mechanical Engineering & Materials Science, Durham, NC: *Graduate Researcher* Aug. 2015 – present

- Conducted independent research involving reinforcement learning, embedded controls, nonlinear dynamics, optimization, and data analysis.
- Designed, built, configured, and documented a computer cluster for the lab group; trained the group to use the cluster.

U.S. Naval Research Laboratory, Washington, D.C., (remote): *NREIP Research Intern* June–Sep. 2020

- Conducted independent research involving reinforcement learning for control of an AUV and particle filtering for state estimation.

Applied Research Associates, Raleigh, NC: *Engineering Intern* May–Aug. 2015

- Designed and developed graphical, memory management, and simulation components of vulnerability assessment engineering software.
- Developed custom Python scripts for version control, data visualization and analysis, and systems integration route visualization.

N.C. State University, Dept. of Mechanical & Aerospace Engineering, Raleigh, NC: *Undergraduate Researcher* Sept. 2011 – May 2015

- Developed automatically foldable structures out of prestrained polymer sheets using nanowire film to generate localized heating.
- Designed and fabricated equipment and samples, developed procedures, tested samples, analyzed results, devised improvements.

Deere & Company, Waterloo, IA: *Product Research & Development Engineering Intern* May–Aug. 2013

- Developed and tested the control software for the power takeoff (PTO) on 5M/5R series tractors. Started with no functioning PTO; by the end of the summer, had fully functional PTO with new mode of operation and superior performance than previous model tractors.

Applied Research Associates, Raleigh, NC: *Engineering Intern* May–Aug. 2012

- Performed and improved validation testing, analysis, and debugging for accreditation of state-of-the-art munitions effects simulation software.
- Received the *Above and Beyond the Call of Duty Award.*

U.S. Environmental Protection Agency, Durham, NC: *Research Intern* Summer 2010 & Summer 2011

- Developed multiple custom computer programs and scripts to analyze experimental data; modified existing software to work with EPA's data.

Leadership, Involvement, & Service

Open Source Software Project Manager: ndarray, ndarray-npy, ndarray-rand, ndarray-stats, ndarray-linalg, py_literal 2018–present

National Honor/Professional Societies: Tau Beta Pi, Phi Beta Kappa, Phi Kappa Phi, ASME, SIAM 2011–present

University Honor Societies: Society of Duke Fellows, NCSU Golden Chain, NCSU University Honors Program 2011–present

N.C. State Engineers' Council: *Department Representative, Secretary, Committee Chair* 2011–2015

- Managed two events with panels, mock interviews, and group sessions to prepare 280 students for Engineering Career Fairs.

General H. Hugh Shelton Leadership Center: *Coach/Mentor/Trainer, Organizing Subcommittee Chairman, Peer Leader* 2008–2013