Omkar Sudhir Patil

✉ omkarpatil64328@gmail.com   📞 (352) 222-1713   in omkar-patil-024   🌐 omkarsudhirpatil.com

○ patilomkarsudhir   🎓 Google Scholar

Education

University of Florida   *Aug 2019 to May 2023*
PhD in Mechanical Engineering

  ○ **Advisor:** Dr. Warren Dixon, **Dissertation:** Implicit and Deep Learning-Based Control Methods for Uncertain Nonlinear Systems

University of Florida   *Aug 2019 to Aug 2022*
MS in Mechanical Engineering

Indian Institute of Technology Delhi   *Jul 2014 to Aug 2018*
B.Tech in Production and Industrial Engineering

Experience

Postdoctoral Research Associate   *May 2023 to present*
University of Florida

Graduate Research Assistant   *Aug 2019 to May 2023*
University of Florida

Project Associate   *May 2018 to Apr 2019*
Indian Institute of Technology Delhi

Publications

Books

[1] **O. Patil**, E. Griffis, and W. E. Dixon, *Deep Learning-Based Adaptive Control: A Lyapunov-Based Approach.* in development with Springer.

Journal Papers

[2] **O. Patil**, R. Sun, S. Bhasin, and W. E. Dixon, "Adaptive control of time-varying parameter systems with asymptotic tracking," *IEEE Trans. Autom. Control*, vol. 67, no. 9, pp. 4809–4815, 2022.

[3] **O. Patil**, D. Le, M. Greene, and W. E. Dixon, "Lyapunov-derived control and adaptive update laws for inner and outer layer weights of a deep neural network," *IEEE Control Syst Lett.*, vol. 6, pp. 1855–1860, 2022.

[4] **O. Patil**, A. Isaly, B. Xian, and W. E. Dixon, "Exponential stability with RISE controllers," *IEEE Control Syst. Lett.*, vol. 6, pp. 1592–1597, 2022.

[5] **O. Patil**, R. Kamalapurkar, and W. Dixon, "A saturated RISE controller with exponential stability guarantees," *IEEE Trans. Autom. Control*, 2025.

[6] **O. Patil**, D. Le, E. Griffis, and W. Dixon, "Lyapunov-based deep residual neural network (ResNet) adaptive control," *IEEE Access*, 2025.

[7] **O. Patil**, E. Griffis, W. Makumi, and W. E. Dixon, "Simultaneous online system identification and control using composite adaptive Lyapunov-based deep neural networks," *IEEE Trans. Autom. Control*, 2025, under review.

[8] **O. Patil**, B. C. Fallin, C. F. Nino, R. G. Hart, and W. E. Dixon, "Bounds on deep neural network partial derivatives with respect to parameters," *arXiv preprint arXiv:2503.21007*, 2025.

[9] A. Isaly, **O. Patil**, H. Sweatland, R. Sanfelice, and W. E. Dixon, "Adaptive safety with a RISE-based disturbance observer," *IEEE Trans. Autom. Control*, vol. 69, no. 7, pp. 4883–4890, 2024.

[10] E. Griffis, **O. Patil**, Z. Bell, and W. Dixon, "Lyapunov-based long short-term memory (Lb-LSTM) neural network-based control," *IEEE Control Syst. Lett.*, vol. 7, pp. 2976–2981, 2023.

[11] C. Nino, **O. Patil**, and W. Dixon, "Second-order heterogeneous multi-agent target tracking without relative velocities," *IEEE Control Systems Letters*, vol. 7, pp. 3663–3668, 2023.

[12] E. Griffis, **O. Patil**, R. Hart, and W. Dixon, "Lyapunov-based long short-term memory (Lb-LSTM) neural network-based adaptive observer," *IEEE Control Syst. Lett.*, vol. 8, pp. 97–102, 2024.

[13] R. Hart, E. Griffis, **O. Patil**, and W. Dixon, "Lyapunov-based physics-informed long short-term memory (LSTM) neural network-based adaptive control," *IEEE Control Syst. Lett.*, vol. 8, pp. 13–18, 2024.

[14] D. Le, **O. Patil**, C. Nino, and W. E. Dixon, "Accelerated gradient approach for deep neural network-based adaptive control of unknown nonlinear systems," *IEEE Trans. Neural Netw. Learn. Syst.*, 2025.

[15] C. F. Nino, **O. Patil**, C. D. Petersen, S. Phillips, and W. E. Dixon, "Collaborative spacecraft servicing under partial feedback using Lyapunov-based deep neural networks," *The Journal of the Astronautical Sciences*, 2025.

[16] C. Nino, **O. Patil**, J. Insinger, M. Eisman, and W. E. Dixon, "Online resnet-based adaptive control for nonlinear target tracking," *IEEE Control Syst. Lett.*, 2025.

[17] C. Nino, **O. Patil**, S. Edwards, and W. E. Dixon, "Distributed rise-based control for exponential heterogeneous multi-agent target tracking of second-order nonlinear systems," *IEEE Control Syst. Lett.*, 2025.

[18] W. Makumi, **O. Patil**, and W. Dixon, "Lyapunov-based adaptive deep learning for approximate dynamic programming," *Automatica*, vol. 180, p. 112 462, 2025.

[19] E. Griffis, **O. Patil**, W. Makumi, and W. Dixon, "Adaptive output feedback control using lyapunov-based deep recurrent neural networks (Lb-DRNNs)," *IEEE Trans. Autom. Control*, under review.

[20] H. Sweatland, **O. Patil**, and W. Dixon, "Adaptive deep neural network-based control barrier functions," *IEEE Trans. Autom. Control*, under review.

[21] S. Akbari, E. J. Griffis, **O. Patil**, and W. E. Dixon, "Lyapunov-based dropout deep neural network (Lb-DDNN) controller," *Automatica*, under review.

[22] B. Fallin, C. Nino, **O. Patil**, and W. Dixon, "Lyapunov-based graph neural networks for adaptive control of multi-agent systems," *IEEE Trans. Autom. Control*, under review.

[23] S. Akbari, C. Nino, **O. Patil**, and W. Dixon, "Lyapunov-based deep neural networks for adaptive control of stochastic nonlinear systems," *IEEE Trans. Autom. Control*, under review.

[24] R. Hart, **O. Patil**, Z. Bell, and W. Dixon, "System identification and control using Lyapunov-based deep neural networks without persistent excitation: A concurrent learning approach," *IEEE Trans. Autom. Control*, under review.

Conference Papers

[25] **O. Patil**, D. M. Le, E. Griffis, and W. E. Dixon, "Deep residual neural network (ResNet)-based adaptive control: A Lyapunov-based approach," in *Proc. IEEE Conf. Decis. Control*, 2022.

[26] **O. Patil**, K. Stubbs, P. Amy, and W. E. Dixon, "Exponential stability with RISE controllers for uncertain nonlinear systems with unknown time-varying state delays," in *Proc. IEEE Conf. Decis. Control*, 2022.

[27] **O. Patil** and S. Bhasin, "Lyapunov based hierarchical trajectory control of an autonomous ground vehicle subjected to slip," in *IFAC World Congr.*, 2020.

[28] D. M. Le, **O. Patil**, C. Nino, and W. E. Dixon, "Accelerated gradient approach for neural network-based adaptive control of nonlinear systems," in *Proc. IEEE Conf. Decis. Control*, 2022.

[29] D. M. Le, **O. Patil**, P. Amy, and W. E. Dixon, "Integral concurrent learning-based accelerated gradient adaptive control of uncertain Euler-Lagrange systems," in *Proc. Am. Control Conf.*, Jun. 2022.

[30] A. Isaly, **O. Patil**, R. Sanfelice, and W. E. Dixon, "Adaptive safety with multiple barrier functions using integral concurrent learning," in *Proc. Am. Control Conf.*, 2021, pp. 3719–3724.

[31] R. Dasgupta, S. B. Roy, **O. Patil**, and S. Bhasin, "A singularity-free hierarchical nonlinear quad-rotorcraft control using saturation and barrier Lyapunov function," in *Proc. Am. Control Conf.*, 2019.

[32] E. Griffis, **O. Patil**, W. Makumi, and W. E. Dixon, "Deep recurrent neural network-based observer for uncertain nonlinear systems," in *IFAC World Congr.*, 2023.

[33] R. Hart, **O. Patil**, E. Griffis, and W. E. Dixon, "Lyapunov-based deep physics-informed neural network-based adaptive control," in *Proc. IEEE Conf. Decis. Control*, 2023.

[34] C. F. Nino, **O. Patil**, S. C. Edwards, Z. I. Bell, and W. E. Dixon, "Distributed target tracking under partial feedback using Lyapunov-based deep neural networks," in *Proc. Am. Control Conf.*, 2025.

[35] C. F. Nino, **O. Patil**, C. D. Petersen, S. Phillips, and W. E. Dixon, "Collaborative spacecraft servicing under partial feedback using Lyapunov-based deep neural networks," in *Proc. AAS/AIAA Sp. Flight Mech. Meet.*, 2025.

[36] W. Wu, **O. Patil**, H. Sweatland, and W. Dixon, "Control contraction metric-based deep neural network adaptive control," in *Proc. IEEE Conf. Decis. Control*, 2025.

[37] S. Kolhe, **O. Patil**, J. Fu, and W. Dixon, "Integral concurrent learning control barrier functions for signal temporal logic tasks under unknown dynamics," in *Proc. IEEE Conf. Decis. Control*, 2025.

Awards

- **Graduate Student Research Award**, 2023, for outstanding research as a graduate student in the Department of Mechanical and Aerospace Engineering, University of Florida

- **BOSS Award**, 2018, for the best hardcore experimental project in Mechanical Engineering discipline, IIT Delhi

Invited Talks

- "Lyapunov-derived control and adaptive update laws for inner and outer layer weights of a deep neural network", *Air Force Office of Scientific Research (AFOSR) Center of Excellence Program Review, Duke University*, Oct. 2021

- "Lyapunov-derived control and adaptive update laws for inner and outer layer weights of a deep neural network", *Resilient and Autonomous Systems Lab (RASLab), Florida State University*, Dec. 2021

- "Deep Residual Neural Network (ResNet)-based Adaptive Control: A Lyapunov-based Approach", *AFOSR COE Program Review, University of Florida*, April. 2023

- "Composite Adaptive Lyapunov-based Deep Neural Network Control", *AFOSR COE Program Review, Duke University*, Dec. 2023

Teaching Experience

- Teaching Assistant, Vibrations (EML4220), University of Florida, Spring 2020

Peer Review Service

- IEEE Transactions on Automatic Control
- Automatica
- IEEE Control Systems Letters
- IEEE Transactions on Control Systems Technology
- IEEE/ASME Transactions on Mechatronics
- IEEE Transactions on Neural Networks and Learning Systems
- International Journal of Adaptive Control and Signal Processing
- Advances on Neural Information Processing Systems (NeurIPS)
- International Conference on Learning and Representations (ICLR)
- IEEE Conference on Decision and Control
- American Control Conference
- IFAC World Congress