Bhathiya Rathnayake

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EDUCATION

University of California San Diego — Jul 2022 – Jun 2025
PhD in Intelligent Systems, Robotics, & Control, GPA: 3.85/4.0 — *San Diego, CA*

Rennselaer Polytechnic Institute — Jan 2020 – May 2022
MS in Computer & Systems Engineering, GPA: 3.89/4.0 — *Troy, NY*

University of Peradeniya — Jan 2014 – Oct 2017
BSc in Electrical & Electronic Engineering, GPA: 3.65/4.0 — *Sri Lanka*

TECHNOLOGIES

Control Systems: PDE System Modeling, Non-linear Control, Adaptive Control, Model Predictive Control, Observers
Robotics: Reinforcement Learning, Optimization, State Estimation, SLAM, Motion Planning
Data Analysis: Probabilistic Modeling, Statistical Methods
Electrical Engineering: Analog Circuits, Power Electronics
Languages: Matlab/Simulink, Python, C++
Frameworks: TensorFlow, Keras, PyTorch, Scikit-learn

EXPERIENCE

University of California San Diego — Jul 2022 – Present
Graduate Student Researcher — Focus: PDEs , Event-triggered Control, Traffic/Water Systems — *San Diego, CA*
- Solved the global exponential stability problem for linear parabolic & hyperbolic PDEs under event-triggered control with dynamic triggering, addressing a problem that had **remained unsolved for 7 years**
- Developed the **first** periodic event-triggered and self-triggered control strategies for parabolic & hyperbolic PDEs with industrial applications in traffic control and water management in reservoirs
- Simulated traffic and water systems to validate the developed control algorithms
- Documented results in research articles published in IEEE Transactions on Automatic Control (IEEE TAC) & Automatica

Los Alamos National Laboratory — Jul 2024 - Aug 2024
Graduate Intern (remote) — Focus: Estimation and Control of Gas Flow in Pipeline Networks — *Remote Internship*
- Developed observers and controllers for gas pipeline networks subject to uncertainties
- Simulated gas flow in pipelines to validate the developed control algorithms
- Documented results in a research paper submitted to American Control Conference (ACC) 2025 [Available online ↗]

Rennselaer Polytechnic Institute — Apr 2020 - May 2022
Graduate Research Student — Focus: PDEs, Event-triggered Control, 3D Printing — *Troy, NY*
- Developed event-triggered boundary control strategies for physics-based model of melting processes (Stefan problem) and reaction-diffusion processes with applications in 3D printing
- Documented results in research articles published in IEEE TAC, Automatica, & International Journal of Control

Sri Lanka Technological Campus — Jan 2018 - Jul 2019
Research Assistant — Focus: Hyperspectral Image Analysis — *Sri Lanka*
- Developed graph-based blind source separation algorithms for unmixing of hyperspectral images
- Documented results in a research article published in IEEE Transactions on Geoscience and Remote Sensing

University of Peradeniya — Jan 2017 - Oct 2017
Undergraduate Research Student — Focus: Robotics and Control — *Sri Lanka*
- Developed a 5-DOF underwater robotic vehicle (URV) and performed system modeling and parameter identification
- Designed MIMO sliding mode controllers to address trajectory tracking and path following control of the URV
- Documented results in a research paper published in an IEEE conference

SELECTED PUBLICATIONS

(J1) **B. Rathnayake**, M. Diagne, J. Cortes, and M. Krstic, "Performance-barrier event-triggered control of a class of reaction-diffusion PDEs ☑", Automatica 174, 112181, 2025

(J2) **B. Rathnayake** and M. Diagne, "Observer-based periodic event-triggered and self-triggered boundary Control of a class of parabolic PDEs ☑", IEEE Transactions on Automatic Control, vol. 69, no. 12, pp. 8836-8843, 2024

(J3) **B. Rathnayake** and M. Diagne, "Observer-based event-triggered boundary control of the one-phase Stefan problem ☑", International Journal of Control, vol. 97, no. 12, pp. pp. 2975-2986, 2024

(J4) **B. Rathnayake**, M. Diagne, and I. Karafyllis, "Sampled-data and event-triggered boundary control of a class of reaction-diffusion PDEs with collocated sensing and actuation ☑", Automatica 137, 110026, 2022

(J5) **B. Rathnayake**, M. Diagne, N. Espitia, and I. Karafyllis, "Observer-based event-triggered boundary control of a class of reaction-diffusion PDEs ☑", IEEE Transactions on Automatic Control, vol. 67, no. 6, pp. 2905 – 2917, 2022

(J6) **B. Rathnayake**, E. M. M. B. Ekanayake, K. Weerakoon, G. M. R. I. Godaliyadda, M. P. B. Ekanayake, and H. M. V. R. Herath, "Graph-based blind hyperspectral unmixing via nonnegative matrix factorization ☑", IEEE Transactions on Geoscience and Remote Sensing, vol. 58, no. 9, pp. 6391-6409, 2020

(C1) **B. Rathnayake**, A. Zlotnik, S. Tokareva, and M. Diagne, "Setpoint tracking and disturbance attenuation for gas pipeline flow subject to uncertainties using backstepping ☑", accepted for publication in the proceedings of IEEE ACC 2025

(C2) P. Zhang, **B. Rathnayake**, M. Diagne, and M. Krstic, "Performance-barrier-based event-triggered boundary control of congested ARZ traffic PDEs ☑", in IFAC-PapersOnLine, vol. 58, no. 10, pp. 182–187, 2024

(C3) **B. Rathnayake**, M. Diagne, J. Cortes, and M. Krstic, "Performance-barrier-based event-triggered boundary control of a class of reaction-diffusion PDEs ☑", in IEEE ACC 2024, pp. 5313–5319

(C4) **B. Rathnayake** and M. Diagne, "Self-triggered boundary control of a class of reaction-diffusion PDEs ☑", in IEEE CDC 2023, pp. 6887–6892

(C5) **B. Rathnayake** and M. Diagne, "Observer-based periodic event-triggered boundary control of the one-phase Stefan problem ☑", in IFAC-PapersOnLine, vol. 56, no. 2, pp. 11415–11422, 2023

(C6) **B. Rathnayake** and M. Diagne, "Periodic event-triggered boundary control of a class of reaction-diffusion PDEs ☑", in IEEE ACC 2023, pp. 1800–1806

(C7) **B. Rathnayake** and M. Diagne, "Event-based boundary control of the Stefan problem: A dynamic triggering approach ☑", in IEEE CDC 2022, pp. 415–420.

(C8) **B. Rathnayake** and M. Diagne, "Event-based boundary control of one-phase Stefan problem: A static triggering approach ☑", in IEEE ACC 2022, pp. 2403–2408

(C9) **B. Rathnayake**, M. Diagne, and I. Karafyllis, "Sampled-data boundary control of a class of reaction-diffusion PDEs with collocated sensing and actuation ☑", in IEEE CDC 2021, pp. 434–441

(C10) **B. Rathnayake**, M. Diagne, N. Espitia, and I. Karafyllis, "Event-triggered output-feedback boundary control of a class of reaction-diffusion PDEs ☑", in IEEE ACC 2021, pp. 4069–4074

(C11) **B. Rathnayake**, K. M. K. Weerakoon, G. M. R. I. Godaliyadda, and M. P. B. Ekanayake, "A robust control paradigm for path following of an underwater robotic vehicle ☑", in 2018 IEEE International Conference on Computer Science & Education (ICCSE), pp. 1-6

REVIEW SERVICES

- IEEE Transactions on Automatic Control
- Automatica
- Systems & Control Letters
- International Journal of Control
- American Control Conference (ACC)
- Conference on Decision and Control (CDC)
- European Control Control (ECC)