Mayank Shekhar JHA

Associate Professor in Control Engineering

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Short Biography

Dr. Mayank Shekhar Jha received his Ph.D. in Automatic Control and Signal Processing from Ecole Centrale de Lille, France, in 2015. Since 2017, he has been an Associate Professor at Université de Lorraine within the Centre de Recherche en Automatique de Nancy (CRAN). He has previously held post-doctoral research position at the Institut National des Sciences Appliquées de Toulouse (INSA Toulouse) France and Research Associate position at Rolls Royce Technology Centre at University of Sheffield, United Kingdom in 2017. Dr. Jha has has authored around 30 publications in prestigious international conferences and journals, leads a Work package (WP) in a project of National Agency for Research (ANR) in France titled "Self-Organizing, Smart and Safe heterogeneous Robots Fleet by collective emergence for a mission (SOS)", has been **Co-PI** of 3 industrially funded scientific projects with French National Space Agency (CNES) and Dassault Aviation (securing total approx. funding of 350K Euros) in last 5 years. His research interests include reinforcement learning for safe learning of dynamical systems, and deep learning for health monitoring and prognostics of systems.

Research Interests

- Safe Reinforcement Learning
- Deep Learning for Health Monitoring and Prognostics (Model-based and AI techniques)
- Learning enabled systems
- Health aware control, Prognostics oriented Control

Education

- **Ph.D.** in Automatic Control and Signal Processing, Ecole Centrale de Lille, France, 2015
- **Masters** in Automatic Control, École Centrale de Lille, France, 2012
- **Bachelors of Technology** in Mechanical Engineering, National Institute of Technology Jalandhar (NIT J), India.

Academic Positions

- **Associate Professor**, Université de Lorraine, CRAN, France, 2017 – Present
- **Research Associate**, Rolls Royce UTC, University of Sheffield, UK, 2017
- **Researcher and Assistant Professor**, Ecole Centrale de Lille, France, 2016–2017
- **Post-Doctoral Researcher**, INSA Toulouse, France, 2016

Distinctions

Recipient of Individual Premium RIPEC between 2023-2026.

Research Supervision

Ph.D. Supervision (2 Ongoing)

- Satya MARTHI (2024 -): Design of a safe control system through reinforcement learning - Application to autonomous mobile systems. Funding: ANR (French National Project) SOS Project (Self-Organizing, Smart, and Safe Heterogeneous Robots Fleet by Collective Emergence).
- Theo Rutschke (2023-...), Physics-driven identification of nonlinear systems for reinforcement learning. Funding by University of Lorraine and French Govt. Ministry.

Ph.D. Supervision (2 Completed)

- Soha KANSO (Oct 2021- Dec 2024),Safe Reinforcement Learning for dynamical systems under degradation". Funded by CRAN, Université de Lorraine. See associated papers here, here, here, here, here.
- Martin Herve de Beaulieu (Nov 2020- Dec 2023). Subject: "Identification and prognosis of state of health of non-linear systems through deep learning, Application to predictive maintenance of business aircraft " In collaboration with **Dassault Aviation**. See **PhD Thesis and associated papers: here, here, here.**

Postdoctoral Supervision

- Dr. Julien Thuillier,, "Health-Aware Control Design of Liquid Propulsion Rocket Engines" in collaboration with **CNES** (2021-2023).

University Collaboration

- 2023-2027: Member and a Work-Package Leader of a French ANR Project Self-Organizing, Smart and Safe heterogeneous robots fleet by collective emergence for a mission (SOS) managed by CRIStAL Lab (Lille, France)
- Member of ECOS-Sud Program 2021-2024 in collaboration with Federico Santa María Technical University, Valparaíso, Chile.

Industrial Collaborations

On-going
2023-2025: Co-PI (Co-principle Investigator) Research Collaboration with CNES, "Design of Learning approaches for Health aware control of Reusable liquid rocket engine".
Past

- 2020-2023 Co-PI (Co-principle Investigator) , Research collaboration with **Dassault Aviation**, Subject: "Identification and prognosis of state of health of non-linear systems through deep learning. Application to predictive maintenance of business aircraft"
- Co-PI (Co-principle Investigator) Collaboration with The French National Centre for Space Studies (CNES)
  - 2021-2023, Subject: *Health Aware Control Design of Liquid Propulsion Rocket Engine.*
  - *Master's Research Project Supervision*
    - *(2021) Remaining useful Life Estimation of Liquid Rocket Engine combustion chamber*
    - (2020) *Improvement of Remaining useful Life Estimation of Liquid Rocket Engine combustion chamber*

Selected Invited Talks

- NASA Ames Research Center, USA (2022, 2023, 2025).
- Fédération Charles Hermite, France (2020)
- International Conference on Electronics, Information, and Communication, South Korea (2021)
- Korea Institute of Science and Technology Europe (2020)

Editorial and Review Activities

- Editorial Board Member, Scientific Reports, Nature.
- Reviewer for various international journals
  - Elsevier:
    - CEP, RESS, ISA Transactions, EAAI, Neurocomputing, Neural Networks.
  - IEEE Transactions
    - Automatic control, System, Man, Cybernetics, Robotics.
- Editorial roles in international conferences (MED, SysTol, ACD)
- Invited Ph.D Thesis Reviewer (External):
  - Dr. Laknath Buddhika Semage, Robust and Efficient Reinforcement Learning for Physics Tasks, Deakin University, Australia.
  - Dr. Armaan Garg, Learning Multi-UAV Policies Using Deep Reinforcement Learning for Flood Area Coverage and Object Tracking, Indian Institute of Technology, Ropar, India.
  - Dr. Périclès COCAUL, Determination of autopilot control laws for launchers with model-free methods: from automatic to safe deep reinforcement learning approaches, Université Paris-Saclay, Ariane Group and ONERA Paris. November 2024.

Administrative Responsibilities

- Elected/Named Member of Counsil of Laboratory CRAN (Conseil de laboratoire) 2023–2027.
- Head (in Department M3 of Polytech Nancy) :
  - Industrial Internships of 4th year of Engineering Cycle,
  - International Mobility of Students.

Organizational Activities

- Organizer of Invited Session titled "Secure and Learning Enabled Systems" in American Control Conference 2025, Denver, USA.
- Co-Organizer of Invited Session titled "Safe and Fault-Resilient Control Learning and Design" at European Control Conference 2025, Thessaloniki, Greece.

- Co-Leader of French National Group "Health Aware Control Design in Dynamic Systems" under GDR MACS Activity (2022-2024). See here :https://gdr-macs.fr/node/4286.
- Co-organizer of Invited session titled "Intelligent data-driven fault diagnosis, prognostics and health aware control" at IFAC World Congress 2023, (IFAC WC 2023), Yokohama, Japan.
- Co-Organiser of Health Aware Control Design in Aerospace Domain Seminar, Polytech Nancy with CNES, France, 17th November 2022. (See Flyer here)
- IPC Chair, 16th European Workshop on Advanced Control and Diagnosis (ACD 2022), Nancy, France. See CFP here.
- Associate Editor for 28th Mediterranean Conference on Control and Automation (MED'2020).
- Workshop and Tutorials Chair for 28th Mediterranean Conference on Control and Automation (MED'2020).
- Publicity chair for 5th International Conference on Control and Fault-Tolerant Systems (SySTOL), 2021.
- IPC Chair, 16th European Workshop on Advanced Control and Diagnosis (ACD 2022), Nancy

Publications

More than 30 peer-reviewed journal articles, conference papers, and book chapters on safe reinforcement learning, hybrid prognostics, fault detection, and deep leanring based prognostics for predictive maintenance.

A detailed list of publications can be seen here: .