Niladri Das

CONTACT

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RESEARCH

- **Nonlinear estimation**
- **Situational awareness**
- **Optimal sensing and data sharing**
- **Nonlinear control, robotics, and machine learning**

EDUCATION

Doctor of Philosophy in **Aerospace Engineering** — Adviser: Dr. R. Bhattacharya
Texas A&M University, USA — 2015 - 2020
Dissertation: Optimal sensing for estimation of nonlinear dynamical systems. — GPA: 3.826

Master of Technology in **Electrical Engineering** — Adviser: Dr. L. Behera
Indian Institute of Technology Kanpur (IIT-K), India — 2012 - 2014
Dissertation: Learning to grasp & programming by demonstration using a 7-DOF Barrett WAM. — GPA : 7.91/10

Bachelor of Engineering in **Electrical Engineering** — Adviser: Dr. A. Chatterjee
Jadavpur University, Kolkata, India — 2008 - 2012
Project: Image processing based object detection. — GPA : 7.84/10

RESEARCH EXPERIENCE

Graduate Research Assistantship at TAMU — Adviser: Dr. K. DeMars, Summer 2020
— Information filter

Graduate Research Assistantship at TAMU — Adviser: Dr. R. Bhattacharya
— Worked on optimal sensing for nonlinear filters from utility and privacy perspective
— Worked on an AFRL project project: *Adaptive Markov Inference Game Optimization for Rapid Discovery of Evasive Satellite Behaviors*, in collaboration with Intelligent Fusion Technology, Inc., where I developed an in-house orbit propagator. (2018-2019)
— Worked on an AFOSR project: *Cloud Computing Based Robust Space Situational Awareness (SSA)*, in collaboration with Dept. of Statistics (TAMU), where I developed Optimal Transport filter based framework for SSA. (2015-2018)

Project Associate at IIT-K — PI: Dr. L. Behera, Aug 2014 - Jun 2015
— Developed Gaussian Mixture based model to compensate the unknown non-linearities of 7 degree of freedom Barrett WAM.
— Collaborated in implementing a inverse kinematic model and higher order Sliding Mode Control for 7 degree of freedom Barrett WAM. [C++ codes][video]
— Developed dynamical system based trajectory learning for Barrett WAM.
— Served as a Thesis mentor for a master's student.
—Taught ROS to two Master's student.

Graduate Research Assistant at IIT-K — Adviser: Dr. L. Behera, July 2013-July 2014
— Developed Inverse Kinematic model for Barrett WAM.
— Implemented Kinect based Object segmentation for grasping using **Deep Learning**.
— Developed a hand-eye autonomous calibration technique for Barrett WAM.

— Implemented Symbolic Encoding based skill learning on Barrett WAM.[video]
— Mentored two Under-Graduate interns.

Publications

Journals

1. **Privacy-Utility Aware Kalman Filtering for LTI Systems** [preparing, 2020]
2. **Optimal Sensor Precision and Sensor Selection for Kalman Filtering with Bounded Errors** | Signal Processing, Elsevier [under review, 2020]
3. **Privacy and Utility Aware Data Sharing for Space Situational Awareness from Ensemble and Unscented Kalman Filtering Perspective** | IEEE Transactions on Aerospace and Electronic Systems [under review, 2019][arXiv]
4. **Optimal Transport Based Tracking of Space Objects in Cylindrical Manifolds** | Journal of Astronautical Sciences, Springer [2019][preprint]
5. **Optimal Transport based Tracking of Space Objects using Range Data from a Single Ranging Station** | Journal of Guidance, Control, and Dynamics [2019][preprint]

Conferences

1. **Utility and Privacy in Object Tracking from Video Stream using Kalman Filter** | International Conference on Information Fusion 2020 [accepted]
2. **Modeling and Optimal Control of Hybrid UAVs with Wind Disturbance** | International Conference on Systems and Control 2020 [second author][accepted]
3. **Eigen Value Analysis in Lower Bounding Uncertainty of Kalman Filter Estimates** | IFAC World Congress 2020 [accepted]
4. **Optimal Transport Based Filtering with Nonlinear State Equality Constraints** | IFAC World Congress 2020 [accepted]
5. **Optimal Sensing Precision in Ensemble and Unscented Kalman Filtering** | IFAC World Congress 2020 [accepted]
6. **On Neural Network Training from Noisy Data using a Novel Filtering Framework** | AIAA SciTech Forum and Exposition 2020 [second author]
7. **Sparse Sensing Architecture For Kalman Filtering With Guaranteed Error Bound.** | IAA Conference on Space Situational Awareness 2017
8. **Control of a 4 DoF Barrett WAM Robot - Modeling, Control Synthesis and Experimental Validation** | IEEE First International Conference on Control, Measurement and Instrumentation 2016 [second author]
9. **Learning Object Manipulation from Demonstration through Vision for the 7-DOF Barrett WAM** | IEEE First International Conference on Control, Measurement and Instrumentation 2016
10. **A probabilistic framework of learning movement primitives from unstructured demonstrations** | IEEE 13th International Conference on Industrial Informatics 2015
11. **Robot Learns from Human Teacher Through Modified Kinesthetic Teaching** | International conference on Advances in Control and Optimization of Dynamic Systems 2014

Teaching Experiences

Graduate Teaching Assistant at TAMU — 13 Jan - May 2020
Assisting Prof. Kyle DeMars for grading assignments for *Advanced Control for Aerospace Vehicles*

Graduate Teaching Fellow at TAMU — 26 Aug - 12 Dec 2019
Taught *Advanced Control for Aerospace Vehicles* to senior Aerospace undergrads (72 students). Taught LTI system, PID, root locus and freq. domain based controller design using Matlab.

Graduate Teaching Assistant at IIT-K July 2012 - July 2014
— Teaching assistant to Dr. L. Behera, Dr. R. Potluri, and Dr. N. K. Verma

SKILLS *Programming Languages and Packages:* Matlab | Python| Julia | ROS | C++.

CURRENT PROFESSIONAL AFFILIATIONS
— American Institute of Aeronautics and Astronautics
— Institute of Electrical and Electronics Engineers
— Society for Industrial and Applied Mathematics
— American Astronautical Society

PAST AFFILIATIONS
— Student Council member of Aerospace Engineering department at TAMU (2017)
— Graduate and Professional Student Council department delegate at TAMU (2017)

SERVICES **Journal Reviewer:** IEEE Systems Journal
Conference Reviewer: IFAC World Congress, CDC

AWARDS
— Winner of A-Hack-of-the-Drones (28-30 Sep 2018)
Member of the **A-Team** from Texas A&M that won the A-Hack-of-the-Drones competition (Sponsor: USArmy Futures Command and MD5) in Austin, Texas. We developed vision based solution for C-SUAS and co-founded AIMS Technologies, LLC
— Awarded Graduate Teaching Fellowship for Fall 2019 at TAMU
— Awarded AERO Graduate Excellence Fellowship for Fall 2019 and Spring 2020 at TAMU
— Awarded AERO Travel Grant for Spring 2019 at TAMU

HONORS Served as a Student Council **Mentor** of Aerospace Engineering Department at TAMU (2018)

WORK PERMIT **F1 Visa** — Eligible to work in the USA for 36 months with Optional Practical Training

PRIMARY REFEREE
— Dr. Raktim Bhattacharya (Dissertation Advisor)
Associate Professor, Department of Aerospace Engineering
Texas A&M University | 3141 TAMU, College Station, TX 77843-3141
Office: HRBB 727C | Phone: +1 979.862.2914 | Email: raktim@tamu.edu

— Dr. Srinivas Rao Vadali (PhD Committee Member)
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— Dr. Suman Chakravorty (PhD Committee Member)
Associate Professor, Department of Aerospace Engineering
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— Dr. Vikram Kinra (Director of Teaching Fellows Program)
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