Saikath Bhattacharya

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https://sasdlc.org/lab/assets/html/saikath.html

Education

1. **Ph.D** *September 2014- Present*
   University of Massachusetts , Dartmouth, USA
   PhD Area: Tradespace Analysis incorporating Reliability, Availability, Maintainability, and Affordability for Systems
   Advisor: Dr. Lance Fiondella

2. **Master Of Technology** *September 2009-May 2011*
   Kalinga Institute of Industrial Technology, Bhubaneswar, India
   Specialization: Communication System Engineering
   Thesis: "Adaptive Location Management in Cellular Networks"
   Advisor: Dr. S S Singh

3. **Bachelor Of Engineering** *August 2005-May 2009*
   Manoharbhai Patel Institute of Engineering and Technology Gondia,
   Nagpur University , India
   Major: Electronics and Communication Engineering
   Project: Automated Multistoried Parking System

Career History

Graduate Research Assistant, *UMASS Dartmouth* *January 2016 - Present*

1. Rotorcraft Tradespace Exploration Incorporating Reliability Engineering supported by the Army Research Laboratory (ARL) through the National Institute of Aerospace (NIA).
   - Developed mathematical models for estimating lifecycle cost based on subsystem level reliability.
   - Formulated multi-objected optimization for rotorcraft tradescape exploration.
   - Contributed towards developing GUI tool to visualize tradespace incorporating reliability metrics.
2. Quantitative Framework to Assess Tradeoffs in Alternative Models and Algorithms for Prognostics and Health Management.
   - Collaborated with Center for Advance Life Cycle Engineering(CALCE), Department of Mechanical Engineering at the University of Maryland, College Park.
   - Developed reliability metrics for estimating cost, availability, utilization, and safety using maintenance theory and remaining useful life concepts.
   - Utilized Kalman filtering approach for lithium-ion battery prognostics.
   - Developed maintenance models incorporating reliability metrics and prognostic distance.

3. Drone Cyber Security: Assurance Methods and Standards for Massachusetts Department of Transportation (MassDOT).
    - Assisted my team members in developing measures, recommendations, and technologies to prevent cyber-attacks.
    - Worked on developing greedy algorithm based countermeasure portfolio section problem.
    - Summarized and categorized various UAV standards related to system assurance and cyber-security.
    - Contributed in drafting the final report for the Massachusetts Department of Transportation, Office of Transportation Planning.

Graduate Teaching Assistant, *UMASS Dartmouth* *Sept 2014 - Dec 2016*

1. ECE 260 Digital Logic & Computer Design, Fall 2015, Spring 2015, Fall 2016
2. ECE 161 Foundations Comp. Engineering II, Spring 2015,Spring 2016
3. ECE 160 Foundations Comp. Engineering I, Fall 2015
4. ECE 311 Digital Electronics, Fall 2014
5. ECE 263, Object-Oriented Software Development, Fall 2014

Lecturer, *KIIT University* *Aug 2011- Aug 2014*

1. Taught Computer Communication Networks, Information Theory and Coding, Optical fiber and Satellite Communication and Electromagnetic Theory

Instructor, *KIIT University* *June 2010-July 2010*

1. Developed structure and modules for certified training course.
2. Taught VHDL programming and its FPGA implementations to 3^{rd} year Engineering students.

Teaching Assistant, *KIIT University* *December 2009- May 2011*

1. Digital Signal Processing
2. Microwave Communication

Internship and Collaborations

1. *CALCE, University of Maryland* *June 2016-August 2016*
    (a) The research was focused on developing a framework for the objective assessment of existing and future combinations of degradation models and predictive algorithms.
    (b) Developed reliability based metrics for assessing tradeoffs in PHM.
2. *Hindustan Copper Limited* *May 2007-June 2007*
    (a) Worked as a summer trainee at Hindustan Copper Ltd., Madhya Pradesh, India. Responsibilities included maintenance and upgrading the wireless communication networks for underground mining areas.

Awards and Honors

1. SRE Stan Ofsthun Best Student Paper Award *Jan 2020*
2. Research Associateship Program (RAP) U.S. Army Research Laboratory (US-ARL)
   Tradespace exploration incorporating PHM for RAMS+C *Sept 2019- May 2020*
3. Society of Risk Analysis travel grant. *December 2017*
4. Systems Engineering Research Center, Doctoral Students Forum, travel grant. *Nov 2017*
5. Best Paper Award, Systems Engineering Tools and Processes Session, AHS 2017,
   Modeling, Analysis, and Optimization of Rotorcraft and Fleet Availability *May 2017*
6. PHM Society, Doctoral Symposium travel grant. *October 2016*
7. UC Doctoral Scholarship, University of Canterbury. *July 2012-Feb 2013*

Languages and skills

Programming: Python, C

Scientific Languages: Matlab, Mathematica, R

Skills: Reliability Analysis, Fault Tree Analysis, Petri Nets, Prognostics and Diagnostics, Maintenance Theory, Software Reliability, Machine learning (SciPy, NumPy, Keras, Tensorflow), Data Analysis, Wireless Sensor Networks, Internet of Things (IoT), Signal Processing

Certification

1. Lean Six Sigma Green Belt, Institute of Industrial and Systems Engineers *May 2020*

Relevant Courses taken

1. ECE 591 Software Reliability *Fall 2015*
2. ECE 560 System Performance Evaluation *Spring 2015*
3. ECE 591 Maintenance Theory *Fall 2014*
4. ECE 544 Fault Tolerant Computing *Fall 2014*

Professional Service

1. Journal Reviewer
   - IEEE Transactions on Reliability
   - Reliability Engineering Systems and Safety
   - IEEE Access
2. Conference Reviewer
   - IEEE International Symposium on Technologies for Homeland Security

Professional Membership

1. **IEEE**, Student Member, *IEEE Reliability Society, IEEE Computational Intelligence Society*
2. **Indian Association of Science** *Annual Member*
3. **Prognostics and Health Management Society** *Student member*
4. **Vertical Flight Society** *Student Member*

Mentoring

1. Supervised a sophomore to design experiments for DC motor breakage analysis and fault prediction using semi supervised machine learning. The research is funded from the office of Undergraduate Research UMASS Dartmouth
2. Faculty advisor to KIIT Robotic Society and was a member of KIIT Nano Satellite team.

Extracurricular

1. Secretary of UMASSD photography club.
2. Student advisor of UMASSD Indian student association

Publications

Journals

4. **S. Bhattacharya,** V. Nagaraju, E. Spero, A. Ghoshal, L. Fiondella, Rotorcraft Tradespace Exploration incorporating Reliability and Availability, In *Research in Engineering Design, Volume 29, Isue 4, pp 589-603, 2018.*.
3. A. Krishna Murthy, **S. Bhattcharya**, L. Fiondella, Optimal Reliability and Cost of Non-Repairable Systems subject to Two Failure Modes considering Correlated Failures, In *International Journal of Reliability, Quality and Safety Engineering, Volume 25, Issue 5, 2018*
2. **S. Bhattacharya** and S S Singh, A Comparative Approach For Location Management Using ARMA, Non-Linear Auto Regression And Neural Network For Cellular Networks, In *Far East Journal of Electronics and Communications Volume 13, Issue 1, pp 17 - 27 2014*
1. A Mishra, S S Singh, **S. Bhattacharya** and P K Pattnaik, A Novel Area Coverage Management Scheme For Sensor Network With Mobile Sensor Nodes, in *Indian Journal of Science and Technology Volume 5 Issue 8 2012.*

Conferences

14. **S. Bhattacharya**, V. Nagaraju, E. Spero, A. Ghoshal, L. Fiondella, Incorporating Reliability Improvement and Fleet Maintenance into Rotorcraft Tradespace Tools, Accepted for *Annual Reliability and Maintainability Symposium, Palm Spring, CA, Jan. 2020.*
13. M. Nafreen, **S. Bhattacharya**, L. Fiondella, Architecture-based Software Reliability incorporating Fault Tolerant Machine Learning, Accepted for *Annual Reliability and Maintainability Symposium, Palm Spring, CA, Jan. 2020.*

12. A. Gula, C. Ellis, **S. Bhattacharya**, L. Fiondella, Software and System Reliability Engineering for Autonomous Systems incorporating Machine Learning, Accepted for *Annual Reliability and Maintainability Symposium, Palm Spring, CA, Jan. 2020.* **SRE Stan Ofsthun Best Student Paper Award**
11. **S Bhattacharya**, L Fiondella, S Saxena, Y Xing, M Pecht, Quantifying the Impact of Prognostic Distance on Average Cost per Cycle, In *Proc. IEEE International conference on Prognostics and Health Management, San Francisco, CA, July 2019.*
10. V. Nagaraju, L Fiondella, **S. Bhattacharya**, E. Spero, and Anindya Ghoshal, Quantifying the Impact of Prognostics and Health Management on Availability and Cost for Tradespace Exploration, In *Proc. 74th American Helicopter Society Annual Forum &Technology Display, Phoenix, AZ, May 2018.*
9. A. Krishna Murthy, **S. Bhattcharya**, L. Fiondella, Optimal Reliability of Series and Parallel Systems subject to Two Failure Modes considering Correlated Failures, In *Proc. International Conference on Reliability and Quality in Design, Chicago, IL.*
8. **S. Bhattcharya**, V. Nagaraju, B. Jafary, K. Katipally, E. Spero, A. Ghoshal, L. Fiondella, Modeling, Analysis, and Optimization of Rotorcraft and Fleet Availability, In *Proc. 73rd American Helicopter Society Annual Forum &Technology Display, Fort Worth, TX, May 2017* **Best paper award, Systems Engineering Tools and Processes Session.**
7. **S. Bhattacharya**, V. Nagaraju, E. Spero, A. Ghoshal, L. Fiondella, Reliability Improvement to Minimize Average Procurement Unit Cost of a Rotorcraft Fleet, In Proc. of *Proc. of Annual Reliability and Maintainability Symposium, Orlando, FL, Jan, 2017.*
6. **S. Bhattacharya**, V. Nagaraju, E. Spero, A. Ghoshal, L. Fiondella, Process Improvement for Rotorcraft Tradespace Exploration incorporating Reliability and Availability, In Proc. of *American Helicopter Society International 72nd Annual Forum &Technology Display, West Palm Beach, FL, May 2016.*
5. **S. Bhattacharya** and L. Fiondella, A Fault-tolerant Classifier for Prognostics and Health Management considering Correlated Failures, In Proc. of *Annual Reliability and Maintainability Symposium, Tucson, AZ, Jan 2016.*
4. L Mohanty, **S. Bhattacharya**, S S Singh, Efficient energy management in Mobile MIMO Cooperative Sensor Networks (M-MCSN), In Proc. of 2^{nd} *International Conference on Computational Intelligence & Networks, Bhubaneswar, Odisha, India,Jan 2016.*
3. V. Nagaraju, **S. Bhattacharya**, E. Spero, A. Ghoshal, L. Fiondella, Rotorcraft Tradespace Exploration Considering Cost and Availability, In Proc. of *American Helicopter Society Capability and Affordability in the Future of the Vertical Lift Industry Meeting.*
2. **S. Bhattacharya**, V. Nagaraju, E. Spero, A. Ghoshal, L. Fiondella, Rotorcraft Tradespace Exploration incorporating Reliability Engineering, In Proc. of *American Helicopter Society International 71st Annual Forum &Technology Display, Virginia Beach, VA, May 2015.*
1. **S. Bhattacharya** and S S Singh, Location Prediction Using Efficient Radial Basis Neural Network, In Proc. of *International Conference for Information and Network Technology, Chennai, India, April 2011*

Report/White paper/Abstract/ Poster Presentation (*presenter)

9. B. Jafary, **S. Bhattacharya**, M. Nafreen, S. Yuan, J. Zhou, L. Wu, P. Manjunath, T. Chigan, L. Fiondella, The Application of Unmanned Aerial Systems In Surface Transportation - Volume II-F: Drone Cyber Security: Assurance Methods and Standards, Report No. 19-010, *Massachusetts Department of Transportation, Boston,MA, 2019.*
8. **S. Bhattacharya***, V. Nagaraju, L. Fiondella, E. Spero, and Anindya Ghoshal, Minimizing Average Procurement Unit Cost for Rotorcraft Tradespace Exploration, Poster presented at the *Society of Risk Analysis (SRA) Annual Meeting, Arlington, VA, December, 2017.*
7. **S. Bhattacharya***, V. Nagaraju, E. Spero, A. Ghoshal, and L. Fiondella, Rotorcraft Tradespace Exploration incorporating Reliability Engineering, Presented at the 5^{th} *Annual Systems Engineering Research Center (SERC) Doctoral Students Forum,* a University-Affiliated Research Center of the US Department of Defense, Stevens Institute of Technology, *Washington DC November, 2017.*
6. **S. Bhattacharya**, V. Nagaraju, E. Spero, A. Ghoshal, and L. Fiondella, Tradespace Analysis and Exploration incorporating Reliability, Availability, Maintainability, and Cost, Presented at the *National Defense Industrial Association (NDIA) Annual Systems Engineering Conference, Springfield, VA October, 2017.*
5. **S. Bhattacharya**, V. Nagaraju, E. Spero, A. Ghoshal, and L. Fiondella, Minimizing Average Procurement Unit Cost of a Rotorcraft Fleet through Reliability Improvement, Presented to *WG 17 Logistics, Reliability and Maintainability at the 85th Military Operations Research Symposium (MORS 2017), West Point, NY, June 2017*
4. **S. Bhattacharya***, L. Fiondella, Meta-Learning for Fault Tolerant PHM Systems considering Correlated Failures, *Doctoral Symposium, Annual Conference of prognostics and health management, Denver, Colorado, Oct 2016.*
3. **S. Bhattacharya**, V. Nagaraju, E. Spero, A. Ghoshal, and L. Fiondella, Tradespace Analysis considering Process and Reliability Improvement, Presented to *WG 25 Analysis of Alternatives (AoA) at the 84rd Military Operations Research Symposium (MORS 2016), Quantico, VA, June 2016.*
2. **S. Bhattacharya**, V. Nagaraju, E. Spero, A. Ghoshal, and L. Fiondella, Challenges and Benefits of incorporating Reliability Engineering into Tradespace Analysis, Presented to *WG 17 Logistics, Reliability and Maintainability and WG 25 Analysis of Alternatives (AoA) at the 83rd Military Operations Research Symposium (MORS 2015), Alexandria, VA, June 2015.*
1. **S. Bhattacharya*** Cooperative Relay Scheduling for Real Time Wireless Industrial Network, Presented at *University of Canterbury, Computer and Software Engineering Graduate Research Showcase, August 2012.*

Works in Preparation

2. **S Bhattacharya**, L Fiondella, S Saxena, M Pecht, Quantitative Assessment of Alternative Models and Algorithms for Prognostics and Health Management, In Preparation for *IEEE transactions on Reliability*
1. **S. Bhattacharya**,T. Wandji, L. Fiondella, Drone Cyber Security: Assurance Methods and Standards, In Preparation for *Journal of Transportation Security*

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