

Dr. Arijit Guha

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Present Address

Room No. A-404, V K Hall of Residence
NIT Rourkela, Rourkela, Dist. - Sundergarh
Odisha - 769008

Permanent/Correspondance Address

H. No.- 554/6, Kasaikati, Jhapetapur
Kharagpur, Dist. - Paschim Midnapur
West Bengal - 721301

Research Interests

Rechargeable Batteries, System Identification, Control System Design, Parameter and State Estimation, Fault Detection and Diagnosis, Prognosis, Battery Health Management System, Electric Vehicles, Renewable Energy.

Academic Career

Doctor of Philosophy, 2018

Department of Electrical Engineering

Indian Institute of Technology-Kharagpur, W.B, India

Thesis Title: *Fractional Order Equivalent Circuit Modeling and State of Health Estimation of Lithium-ion Batteries*

Supervisor: Prof. Amit Patra

Master of Technology, 2011

Control Systems Engineering

Department of Electrical Engineering

Indian Institute of Technology-Kharagpur, W.B, India

Thesis Title: *Controller Design and Controller Order Reduction for Continuous-Time Systems*

Supervisor: Prof. Jayanta Pal

Bachelor of Technology, 2008

Electronics and Instrumentation Engineering

University of Kalyani, W.B, India

Thesis Title: *Implementation of a Seven Digit Integer Calculator Based on Microprocessor (8085) used for Arithmetical Calculations*

Supervisor: Dr. Debashree Chanda (Sarkar)

Higher Secondary Education, 2004

West Bengal Council of Higher Secondary Education (W.B.C.H.S.E), W.B, India

Secondary Education (Madhyamik), 2002

West Bengal Board of Secondary Education (W.B.B.S.E), W.B, India

Work Experience

Assistant Professor Grade-II, June 2020 - Present
Department of Electrical Engineering,
National Institute of Technology-Rourkela, Odisha, India

- Principles of Control Systems Engineering (UG).
- Digital Control (PG).

Senior R&D Engineer, September 2019 - May 2020
ABB Global Industries and Services Private Limited, Bengaluru, India

- Heat Exchanger fouling prediction.
- Time Series modeling.
- Estimation and filtering.
- Model Calibration.
- Predictive Analytics.
- System anomaly detection.

Consultant, August 2018 - September 2019
Samsung R&D Institute, Bengaluru, India

- Development of mathematical models for Li-ion batteries.
- Fault detection in Li-ion batteries.
- Advanced SoH estimation methods to extend battery life and reduce degradation.
- Adaptive charging algorithm development for battery powered applications.
- Battery Pack modeling, thermal analysis and SoH prediction.
- Li-ion cell electrochemical modeling.
- Electrical and Mechanical abuse testing on Li-ion batteries.
- Aging experiments on Li-ion batteries.

Research Associate, February 2018 - April 2018
Department of Electrical Engineering, IIT Kharagpur, India

- Development of SoC and SoH Algorithms and their coding in the battery management systems (BMS) software at Tata Motors, Pune for the Hybrid Electric Vehicle (HEV) Project sponsored by MHRD, Department of Higher Education, New Delhi.

Publications

Journals

- **A. Guha** and A. Patra, "State of Health estimation of lithium-ion batteries using capacity fade and internal resistance growth models," in *IEEE Transactions on Transportation Electrification*, vol. 4, no. 1, pp. 135-146, 2018.
- **A. Guha** and A. Patra, "Online estimation of the electrochemical impedance spectrum and remaining useful life of lithium-ion batteries", in *IEEE Transactions on Instrumentation and Measurement*, vol. 67, no. 8, pp. 1836-1849, 2018.
- K. Jain, **A. Guha** and A. Patra, "A Particle Filter Based Framework for the Prognosis of Atherosclerosis via Lumped Cardiovascular Modeling", *International Journal of Prognostics and Health Management*, vol. 10, no. 002, pp. 9, 2019.

- A. Naha, S. Han, S. Agarwal, **A. Guha**, A. Khandelwal, P. Tagade, K. S. Hariharan, S. M. Kolake, J. Yoon and B. Oh, “An Incremental Voltage Difference Based Technique for Online State of Health Estimation of Li-ion Batteries”, *Nature Scientific Reports*, vol. 10, no. 1, pp. 1-11, 2020.
- K. Jain, S. Jain, **A. Guha** and A. Patra, “An Approach to Early Stage Detection of Atherosclerosis using Arterial Blood Pressure Measurements”, *under review in IEEE Transactions on Biomedical Engineering (TBME)*, 2020.

Patents

- **A. Guha** et al., ”State-of-Health Improvement of Lithium-ion Rechargeable Batteries Based on an Optimized Charge Current Profile,” Submitted Patent Idea (**Graded as A1**), 2019.
- M. Gottapu, **A. Guha**, S. P Adiga, K. Y. Kim, ”State-of-Charge Estimation of Lithium-ion Battery Packs considering Electrochemical Cell Models,” Submitted Patent Idea (**Graded as A1**), 2020.

Conferences

- **A. Guha** and A. Patra, “Particle Filtering based Estimation of Remaining Useful Life of Lithium-ion Batteries Employing Power Fading Data,” *IEEE International Conference on Prognostics and Health Management(ICPHM)*, pp. 193-198, Dallas, Texas, USA, June 19-21, 2017.
- **A. Guha**, A. Patra and Vaisakh K V, “Remaining Useful Life Estimation of Lithium-ion Batteries based on the Internal Resistance Growth Model,” *Indian Control Conference (ICC), IEEE*, pp. 33-38, IIT Guwahati, India, January 4-6, 2017.
- **A. Guha**, Vaisakh K V and A. Patra, “Remaining Useful Life Estimation of Lithium-ion Batteries based on a new Capacity Degradation Model,” *IEEE Transportation Electrification Conference and Expo, Asia - Pacific (ITEC Asia-Pacific)*, pp.555-560, Busan, South Korea, June 1-4, 2016.

Membership of Professional Body

- IEEE

Professional Activities

- Reviewer of IEEE TechSym 2016 Symposium.
- Reviewer of IEEE Transactions on Transportation Electrification.
- Reviewer of IEEE Transactions on Instrumentation and Measurement.
- Reviewer of IEEE Transactions on Power Electronics.
- Reviewer of International Journal of Energy Research.
- Reviewer of Reliability Engineering and System Safety.
- Reviewer of The Journal of Energy Storage.

Academic Achievements and Awards

- Winner of the Chairman's Award (First Prize) in the Texas Instruments-Department of Science and Technology organized India Innovation Challenge 2017 for the product on Battery Management Systems.
- Among Top 5 Finalists in KPIT Shodh Awards 2019 organized by KPIT and IISER Pune for research on Energy and Mobility domain.
- All India Rank 48 in GATE-2009 Examination.
- Stood 4th in Higher Secondary Examination in school in the year of 2004 among all students.

Invited Talks

- Invited to present a lecture on the topic, "Modeling, estimation and diagnosis of Lithium-ion batteries" at the AICTE Training and Learning (ATAL) Academy (Online FDP) on Energy Storage for Sustainable Development organized by NIT Silchar held during 26th - 30th September, 2020.

Extra-Curricular Activities

- Playing Cricket
- Painting
- Traveling

Personal Information

Gender : Male

Nationality : Indian

Pan No: AQXPG3354Q

Passport No: S3286650

References

Prof. Amit Patra
Professor, Department of Electrical Engineering
Indian Institute of Technology, Kharagpur
West Bengal, Pin-721302, India
Email-id: amit@ee.iitkgp.ernet.in

Prof. Siddhartha Sen
Professor, Department of Electrical Engineering
Indian Institute of Technology, Kharagpur
West Bengal, Pin-721302, India
Email-id: ssen@ee.iitkgp.ernet.in

Dr. Anshul Kaushik
Senior Chief Engineer, No. 2870, Phoenix Building, Samsung R&D Institute,
Bagmane Constellation Business Park, Bengaluru, Karnataka, Pin-560037, India
Email-id: anshul.kaushik@gmail.com

Declaration

I hereby declare that the above mentioned information is true to the best of my knowledge.

Date: 02.10.2020

Place: Rourkela

(Dr. Arijit Guha)