NING TIAN

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SUMMARY

- 5 year algorithm development for lithium-ion battery management systems
- 3 year hands-on experience with battery characterization, validation and cycling test
- 3 year CFD analysis of thermal systems such as gas turbine blades and battery packs

EDUCATION

Ph.D., University of Kansas, Lawrence, Kansas — Expected December 2020

Dissertation: *A study of computationally efficient battery management: Modeling, identification, estimation and control*

Major: Dynamic Systems and Control, Advisor: Dr. Huazhen Fang

M.S., Northwestern Polytechnical University, Xi'an, China — Awarded 2015

Thesis: *Numerical and experimental investigation of turbine blade trailing edge internal cooling*

Major: Thermal Engineering, Advisor: Dr. Huiren Zhu

B.S., Northwestern Polytechnical University, Xi'an, China — Awarded 2012

Major: Thermal Engineering (graduated with honors)

RESEARCH EXPERIENCE

ISS Lab (Battery Management), University of Kansas — 2015–2019

Graduate Research Assistant, Advisor: Dr. Huazhen Fang

- Conduct research on embedded system application-oriented lithium-ion battery management, including battery physics-based equivalent circuit modeling, parameter identification, state estimation, battery health-aware optimal charging, and battery pack thermal management
- Complete 4 journal papers (all first-authored) and 7 conference papers on battery management
- Direct lab battery tester operation and oversee around ten students in battery testing

Heat Transfer and Cooling Lab, Northwestern Polytechnical University — 2012–2015

Graduate Research Assistant, Advisor: Dr. Huiren Zhu

- Performed CFD simulation to study impingement cooling at jet engine turbine blade
- Conducted heat transfer measurement of model blade using transient liquid crystal technique

WORK EXPERIENCE

Battery R&D Group, Romeo Power Technology, Vernon, California — August 2020-Present

Battery Engineer, Manager: Dr. Hector Perez

- Develop battery module models and support battery management algorithm development

Battery Simulation Group, ANSYS, Lebanon, New Hampshire Summer 2019

Battery Software Development Intern, Manager: Dr. Shaoping Li

- Wrote tutorials for ANSYS Fluent multiphysics-based battery modeling package
- Tested ANSYS Fluent battery model identification tool and user-defined battery model
- Performed CFD simulation of thermal field of industrial battery packs using ANSYS Fluent

TEACHING EXPERIENCE

Mechanical Engineering Department, University of Kansas Spring 2020

Graduate Teaching Assistant for ME455 Measurements and Experimentation

- Lead 4 lab sessions every week and instruct students (around 70) on use of lab equipment like function generator, oscilloscope, DMM, transducer and on lab experiments of data acquisition, signal processing, circuit design like voltage divider, amplifier and low-pass filter

Mechanical Engineering Department, University of Kansas Fall 2019

Graduate Teaching Assistant for ME320 Dynamics and ME321 Dynamic Simulations

- Assisted with ME320 in-class group discussions and quiz sessions and held office hours
- Taught students (around 90) in ME321 lab setting for dynamic simulation using Adams

JOURNAL PAPERS

J.6 H. Movahedi, **N. Tian**, H. Fang and R. Rajamani, "Hysteresis compensation and nonlinear observer design for state-of-charge estimation using a nonlinear double-capacitor Li-ion battery model," *IEEE/ASME Transactions on Mechatronics* (Impact factor: 5.710), under review

J.5 **N. Tian**, H. Fang and Y. Wang, "Real-time optimal lithium-ion battery charging based on explicit model predictive control," *IEEE Transactions on Industrial Informatics* (Impact factor: 7.377), 2020

J.4 **N. Tian**, Y. Wang, J. Chen and H. Fang, "One-shot parameter identification of an equivalent circuit model for batteries: Methods and validation," *Journal of Energy Storage* (Impact factor: 3.517), 2020

J.3 **N. Tian**, H. Fang, J. Chen and Y. Wang, "Nonlinear double-capacitor model for rechargeable batteries: Modeling, identification and validation," *IEEE Transactions on Control Systems Technology* (Impact factor: 4.883), 2020

J.2 **N. Tian**, H. Fang and Y. Wang, "3-D temperature field reconstruction for a lithium-ion battery pack: A distributed Kalman filtering approach," *IEEE Transactions on Control Systems Technology* (Impact factor: 4.883), vol. 27, no. 2, pp. 847–854, 2019

J.1 H. Fang, **N. Tian**, Y. Wang, M. Zhou and M.A. Haile, "Nonlinear Bayesian estimation: From Kalman filtering to a broader horizon," *IEEE/CAA Journal of Automatica Sinica* (Impact factor: 5.730), vol. 5, no. 2, pp. 401–417, 2018

CONFERENCE PAPERS

C.8 H. Movahedi, **N. Tian**, H. Fang and R. Rajamani, "Hysteresis compensation and nonlinear observer design for state-of-charge estimation using a nonlinear double-capacitor Li-ion battery model," submitted to *the 2021 American Control Conference*, New Orleans, USA, 2021

C.7 M. Proctor, **N. Tian** and H. Fang, "Battery state-of-charge estimation based on nonlinear double-capacitor model and extended Kalman filter," in *Proceedings of the 2020 IEEE Annual Green Technologies Conference*, Oklahoma City, USA, 2020

C.6 **N. Tian**, H. Fang and Y. Wang, "Parameter identification of the nonlinear double-capacitor model for lithium-ion batteries: From the Wiener perspective," in *Proceedings of American Control Conference*, Philadelphia, USA, Jul. 10–12, 2019

C.5 **N. Tian**, H. Fang and Y. Wang, "Real-time optimal lithium-ion battery charging based on explicit model predictive control," in *Proceedings of the 28th International Symposium on Industrial Electronics*, Vancouver, Canada, Jun. 12–14, 2019

C.4 **N. Tian**, H. Fang and J. Chen, "A new nonlinear double-capacitor model for rechargeable batteries," in *Proceedings of the 44th Annual Conference of the IEEE Industrial Electronics Society*, Washington D.C., USA, Oct. 21–23, 2018

C.3 **N. Tian**, Y. Wang, J. Chen and H. Fang, "On parameter identification of an equivalent circuit model for lithium-ion batteries," in *Proceedings of IEEE Conference on Control Technology and Applications*, Kohala Coast, HI, USA, Aug. 27–30, 2017

C.2 **N. Tian** and H. Fang, "Distributed Kalman filtering-based three-dimensional temperature field reconstruction for a lithium-ion battery pack," in *Proceedings of American Control Conference*, Seattle, WA, USA, May. 24–26, 2017

C.1 **N. Tian**, H. Zhu and M. Zhang, "Numerical analysis of flow and heat transfer of inclined impingement in the trailing edge of turbine blade," in *International Symposium on Jet Propulsion and Power Engineering*, Beijing, China, Sep. 15–19, 2014

PATENT

N. Tian and H. Zhu, "An inclined impingement cooling channel," Patent No. CN104,265,376B, April 2016 (assigned to Northwestern Polytechnical University, Xi'an, China)

PRESENTATIONS

P.7 "Advanced lithium-ion battery management," at 2019 American Control Conference, Philadelphia, Jul. 11, 2019

P.6 "Parameter identification of the nonlinear double-capacitor model for Li-ion batteries: From the Wiener perspective," at 2019 American Control Conference, Philadelphia, Jul. 10, 2019

P.5 "A new nonlinear double-capacitor model for rechargeable batteries," at 8th Midwest Workshop on Control and Game Theory at Washington University in St. Louis, Apr. 27, 2019

P.4 "A new equivalent circuit model for rechargeable batteries," at 13th Berkeley Energy & Resources Collaborative (BERC) Energy Summit, UC Berkeley, Feb. 21, 2019

P.3 "A new nonlinear double-capacitor model for rechargeable batteries," at 44th Annual Conference of the IEEE Industrial Electronics Society, Washington D.C., Oct. 22, 2018

P.2 "Model predictive control for battery charging," at 1st Model Predictive Control Summer School, University of Wisconsin-Madison, Jul. 28, 2017

P.1 "Distributed Kalman filtering-based 3-D temperature field reconstruction for a lithium-ion battery pack," at 2017 American Control Conference, Seattle, Washington, May. 24, 2017

EXTRACURRICULAR EXPERIENCE

Orientation Leader, Summer Orientation at University of Kansas, Summer 2018

Education Volunteer, Lab Outreach at Douglas County Juvenile Detention Center, 2016–Present

Education Volunteer, Engineering Expo and Summer Camp at University of Kansas, 2016

Vice President, Student Branch of Shaanxi Society of Engineering Thermophysics, 2014–2015

Sessional Lecturer, Xi'an Electric Power College, Xi'an, China, Fall 2013

Freshman Mentor, Northwestern Polytechnical University, Xi'an, China, Fall 2011

Volunteer Leader, International Horticultural Exposition, Xi'an, China, July 2011

Education Volunteer, Xinfeng Elementary School, Zhangye, China, July 2009

ACADEMIC SERVICE

Student Liaison for ASME Dynamic Systems Control Division (DSCD)

- Organized Student Career Advising Session (10 panel professionals and around 40 attendees) virtually at American Control Conference (ACC) 2020 in Denver, Colorado
- Organized Student Career Advising Session (10 panel professionals and around 50 student attendees) at Dynamic Systems and Control Conference (DSCC) 2019 in Park City, Utah

Paper Reviewer

- Journal of Control, Automation and Electrical Systems
- CDC (2019, 2020), ACC (2017, 2019, 2020, 2021), IFAC World Congress (2020), DSCC (2017, 2018, 2020), IEEE Conference on Control Technology and Applications (2017, 2018), IEEE International Conference on Control and Automation (2017, 2019), IEEE International Symposium on Industrial Electronics (2019), IEEE International Conference on Industrial Electronics for Sustainable Energy Systems (2020), SAE World Congress (2020)

MEMBERSHIP

IEEE Student Membership 2017–Present

AWARDS

Tradition of Excellence Award, University of Kansas	2019
International Student Leader, KU International Student Services	2018, 2019
Student Travel Award, 2019 URSSI Winter School in Research Software Engineering	2019
Student Travel Award, 2019 American Control Conference	2019
Student Travel Award, 8th Midwest Workshop on Control and Game Theory	2019
GEA Travel Award, KU Engineering School	2018, 2019
Graduate Presentation Travel Award, University of Kansas	2018
Student Travel Award, 1st Model Predictive Control Summer School	2017

SKILLS

MATLAB/Simulink, C, Python, LabVIEW, SolidWorks, Adams, ANSYS Fluent, UG, AutoCAD, CSS, HTML, Circuit Design, Arduino