Noah Salk

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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA, **Started September 2020**
PhD, Electrical Engineering (Landsman Fellow) Research Area: High Power Electromagnetics
Advisor: Dr. Chathan Cooke GPA: 5.00/5.00

University of Illinois at Urbana-Champaign, Urbana, IL, **May 2020**
BS, Electrical Engineering GPA: 3.98/4.00

Awards: Landsman EE Fellowship; Robert C. MacClinchie; Grainger Power Engineering; IEEE PES Scholarship; 2x Jules D. Falzer Memorial; Edward C. Jordan; Russell E. Berthold; Bronze Tablet (University Honors)

Study Abroad: National University of Singapore **Fall 2018 Semester**

EXPERIENCE

Massachusetts Institute of Technology, Cambridge, MA, *Graduate Research Assistant* **September 2020-Present**

- AC loss reduction for a high efficiency, 40 kW air-core resonant power transformer (ProlecGE)

Hinetics LLC, Champaign, IL, *Electrical Engineer* **January 2020-Present**

- Managed a NASA Phase II SBIR project to manufacture and demo a subscale motor for aircraft propulsion
- Transient combined electrical and thermal system modeling for eVTOL load profile optimization (Air Force STTR)
- Wrote a NASA Phase I SBIR proposal for a new additively manufactured yoke-embedded heatsink
- Developed a pole-pair test for an offshore wind turbine's actively shielded superconducting field coils (NSF Phase II)
- Designed a new coil mold for form-wound air-core windings with cured resin

Ford Motor Company, Chicago, IL, *Power Electronics R&D Intern* **June-August 2020**

- Compared Wide Band Gap (WBG) Semiconductors with conventional Silicon IGBTs for traction inverter applications
- Developed a GUI to visualize performance over various operating biases and temperatures. This includes calculating parameters of interest from test data collected on power modules in Ford's inventory.

Haran Research Group, Urbana, IL, *Research Assistant* **April 2019-May 2020**

- Performed multi-objective optimization for the design of superconducting machines for electric aircraft and wind turbine applications; preliminary work for NASA's LH_2, fuel-cell powered commercial aircraft concept (CHEETA)
- Carried out EM FEA for a test rotor to measure ac losses in superconducting coils
- Aided in the development and application of ac loss models for superconducting machine windings
- Created a 3D model to demonstrate the machine topology for a Pareto-optimal design

Naval Surface Warfare Center, Crane, IN, *SSEP Electrical Engineering Intern* **May-August 2018**

- Performed cybersecurity research on vulnerabilities in the Ohio-class submarine's air-gapped fire control systems
- Detected and visualized a Funtenna based side-channel emanating from a monitor using an SDR
- Demonstrated practicality of parallel spectrum scanning for side-channel supervision and automatic detection with DSP
- Completed a project quoted for $250,000 using a $20 commercial SDR

PROJECTS AND LEADERSHIP EXPERIENCE

Illini Air Shuttle, *President and Co-founder* **September 2019-May 2020**

- Founded an RSO to develop an electric VTOL air shuttle concept for transportation between Champaign, IL and Chicago, IL; presented at AIAA EATS 2019
- Modeled a power system for safety analysis; includes dq motor control, power electronics, and machine parameters
- Developed an optimization scheme for aircraft design considering mission profile and weight estimations

CAMPUS INVOLVEMENT

Power and Energy Conference at Illinois (PECI), UIUC, *Corporate Relations Co-chair* **August 2019-May 2020**
Eta Kappa Nu (HKN) Alpha Chapter, UIUC, *Active Member* **January 2018-May 2020**

ADDITIONAL EXPERIENCE

Electrical and Computer Engineering Department, Champaign, IL, *ECE 385 UA* **August 2019-May 2020**
Electrical and Computer Engineering Department, Champaign, IL, *ECE 210 Course Grader* **January-May 2019**
University of Illinois Foundation, Champaign, IL, *Research and Portfolio Management* **October 2017-May 2018**

SPECIALIZED SKILLS

Programs: MATLAB, FEMM, COMSOL, Altair Flux, LTSpice, KiCad, Simulink, Autodesk Inventor, GOSET
Languages: Mandarin (Conversational; "Intermediate")

Publications and Conference Papers

- T. Balachandran, D. Lee, N. Salk, J. Xiao and K. S. Haran, "Evaluation and Mitigation of AC Losses in a Fully Superconducting Machine for Wind Turbine Applications," in *IEEE Transactions on Applied Superconductivity*, vol. 30, no. 4, pp. 1-5, June 2020
- T. Balachandran, D. Lee, N. J. Salk, and K. S. Haran, "A fully superconducting air-core machine for aircraft propulsion," *IOP Conference Series: Materials Science and Engineering*, *Advances in Cryogenic Engineering: Proceedings of the Cryogenic Engineering Conference (CEC) 2019*, June 2020
- J. Xiao, N. Salk and K. Haran, "Conceptual Design of an eVTOL Air Shuttle for Rapid Intercity Transport," *2020 IEEE Power and Energy Conference at Illinois (PECI),* Champaign, IL, USA, 2020, pp. 1-8