AMANDA SUTRISNO

EMAIL: AMANDA@SUTRISNO.ME   PHONE: +1 909 706 1088

SUMMARY

Third year mechanical engineering PhD student . Research interests include theoretical modeling/simulation and automatic design for robotics. Prior research experience in quantum mechanics/solid state physics.

EDUCATION

Vanderbilt University   ,   Nashville, USA   Sep 2020 – present
Doctor of Philosophy(PhD), Mechanical Engineering (CGPA: 3.7/4.0)
The Wond'ry Quantum Studio – Introduction to Quantum Computing certificate (2022)

Singapore University of Technology and Design, Singapore   May 2013 – Sep 2016
Bachelor of Engineering(BEng), EPD, General Engineering (CGPA: 3.5/4.0)

RESEARCH HIGHLIGHTS

Publication popularized in the newspaper "*The Guardian*": A. Sutrisno and D. J. Braun, "How to Run 50% faster without external energy", Sci. Adv., (2020).
https://www.theguardian.com/science/2020/mar/26/spring-heeled-concept-that-could-see-usain-bolt-rocket-to-50mph

This paper was selected for ***Editor's Research Highlights in condensed matter physics*** in the journal *Nature Communications*. C. Lee, A. Sutrisno, et. al., "Imaging nodal knots in momentum space through topolectrical circuits", Nat. Commun., (2020). (cited 57 times as of Dec 2022).

SKILLS & EXPERTISE

Theoretical Modelling/Simulation: Quantum mechanics, Solid State Physics, Nonlinear Optimization, Partial Differential Equations, Finite Element Method, Solid mechanics.

Programming: Python, C++, html, CSS, Javascript, MATLAB

Commercial/Open Source Software: IBM Qiskit, Scikit-Learn, Ansys Mechanical

RESEARCH EXPERIENCE

Feb 2020 – present   Vanderbilt University   Nashville, TN
Research Assistant/PhD Student
Advanced Robotics and Control (ARC) Lab (**PI: Professor David Braun**)

- Develops flexible, 3D-printable, "passive mechanisms", devices to store and manipulate energy without requiring an internal power supply.
- Passive mechanisms find use in human augmentation applications such as building a battery-less leg exoskeleton to enable a human to run 50% faster or jump 3x higher.
- Develops optimization algorithms to perform automatic design for passive mechanisms, i.e software that optimizes the shape of the structure to minimize weight and size, and maximize energy stored.
- Attended an introductory quantum computing course at the Wond'ry Design studio. Interested in quantum optimization applications to enable faster algorithms to design passive mechanisms.

Jan 2019 – Jan 2020 SUTD   Singapore

Research Engineer

Electron Photon Plasmonic and Plasma interaction (EPPPi) Group. (PI: Professor Ricky Ang)

- Designed and constructed inductor/capacitor(LC) circuits to mimic material properties of topological quantum materials.
- Simulated AC impedance of electronic circuit with over 300 inductor/capacitor components in Python, subject to real world effects such as component value tolerance and parasitic resistance.
- Applied machine learning tools in python (Scikit learn, nearest neighbor algorithm) to optimize ideal capacitor values in simulated electronic circuit to give experimental results closest to theoretical prediction given real world effects.

May 2017 – Jan 2019   SUTD   Singapore

Research Engineer

Dynamics and Control Lab (PI: Assistant Professor David Braun, now at Vanderbilt University, Advanced Robotics and Control Lab)

- Theoretical modeling of hypothetical wearable exoskeletons and interaction with the human body using spring/mass models.
- Analytically solved ordinary differential equations of spring/mass models to theorize new kinds of wearable exoskeletons to augment human athletic performance.
- Designed and programmed electronics to control wearable exoskeletons.

INDUSTRY EXPERIENCE

Nov 2016 – May 2017   Micron Technology Singapore

Product Engineer (NAND Flash Memory)

- Responsibilities included diagnosing, characterizing, and providing solutions to defects in NAND flash memory chips affecting high-volume manufacturing yield.
- Discovered a chip defect affecting 10% of the manufacturing yield caused by a change in semiconductor doping between previous and current generation memory devices.
- Developed a model of the chip defect using semiconductor/quantum physics to show that the defect does not affect the long term reliability of the chip
- Appointed liaison between the manufacturing team in Singapore and the research and development team in the US/Italy. Communicated recent internal research papers on semiconductor/quantum physics to the engineering team.

PUBLICATIONS

A. Sutrisno and D. J. Braun, "High-energy-density 3D-printed Composite Springs for Lightweight and Energy-efficient Compliant Robots", arXiv preprint arXiv:2211.09245, (2022).

A. Sutrisno and D. J. Braun, "How to Run 50% Faster without External Energy",   *Science Advances*, 6(13), eaay1950, (2020).

C. H. Lee, **A. Sutrisno**, T. Hofmann, T. Helbig, Y. H. Liu, Y. S. Ang, L. K. Ang, X. Zhang, M. Greiter, and R. Thomale, "Imaging nodal knots in momentum space through topolectrical circuits", *Nature Communications*, 11(1), 4385, (2020).

A. Sutrisno and D. J. Braun, "Enhancing Mobility with Quasi-passive Variable Stiffness Exoskeletons", *IEEE Trans. Neural Syst. Rehabil. Eng.*, 27(3), 487-496, (2019).