# Conlain Kelly

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## Education

**M.S. / Ph.D.** **Georgia Institute of Technology** **Expected graduation: May 2024**

- Computational Science and Engineering; Minor in Statistical Modeling (GPA: 4.0/4.0)

**B.S.** **University of Wisconsin – Madison** **May 2019**

- Double major in Applied Math, Engineering, and Physics; Computer Science (GPA: 4.0/4.0)

## Skills and Technologies

- Languages: Skilled in Python, C, and C++. Proficient in Java, HTML/JavaScript/CSS
- Frameworks: Linux, Git, Docker; PyTorch, JAX; OpenMP, CUDA, MPI; OptiX, OpenGL

## Employment

**Graduate Research Assistant** **Georgia Tech / MINED Research Group** **Fall 2019 – Present**

- Designed hybrid physics-centric machine learning models for accelerated materials design (PI: Surya Kalidindi).
- Mentored junior students, organized internal meetings, and presented at departmental seminars.

**Intern** **NASA JPL / ANRE Technologies** **Summer 2023**

- Reengineered timestepping and integration routines for DARTS simulation software (PI: Abhi Jain).
- Architected new C/C++ interface between SUNDIALS open-source ODE/DAE solvers and DARTS.
- Developed procedure to benchmark and tune time integrators for recursive multibody dynamics, leading to ≈200 % speedup in simulation of EELS prototype robot using minimal-coordinates formulation.

**Intern** **NASA JPL / Caltech** **Summer 2019**

- Parallelized a recursive dynamics solver for DARTS simulation software using OpenMP (PI: Abhi Jain).
- Implemented ray-tracing rendering & sensor simulation backend for DARTS via Nvidia OptiX toolkit.

**Hilldale Fellow** **UW Simulation-Based Engineering Lab** **Summer 2016 – May 2019**

- Developed GPU granular dynamics solver for large-scale (~100 million-body) simulations (PI: Dan Negrut).
- Served as assistant systems administrator for Euler, a heterogeneous ~1300-core CPU/GPU cluster.
- Created materials for and engaged in campus outreach and educational events.

**Product Development Intern** **Ford Motor Company / Livio** **Summer 2018**

- Assisted development of SmartDeviceLink open-source in-vehicle communications software.
- Developed features for major version release and enhanced existing C++ codebase.
- Drafted and implemented major feature overhauls while maintaining legacy compatibility.

## Awards

- **Novelis Graduate Scholarship** (2023)
- **Georgia Tech CRIDC Poster Award** (2022)
- **National Science Foundation Graduate Research Fellowship** (2019)
- **Astronaut Scholarship** (2018)
- **UW Hilldale Undergraduate Research Fellowship** (2017)

## Selected Publications

- A. P. Generale, **C. Kelly**, G. Harrington, A. E. Robertson, M. Buzzy, and S. Kalidindi. A bayesian approach to designing microstructures and processing pathways for tailored material properties. In *AI for Accelerated Materials Design - NeurIPS 2023 Workshop*, 2023
- A. Generale, A. E. Robertson, **C. Kelly**, and S. R. Kalidindi. Inverse stochastic microstructure design. *Under Review at Acta Materialia*, (4590691), Oct. 2023. URL `https://papers.ssrn.com/abstract=4590691`
- A. E. Robertson, **C. Kelly**, M. Buzzy, and S. R. Kalidindi. Local–global decompositions for conditional microstructure generation. *Acta Materialia*, 2023
- G. H. Harrington, **C. Kelly**, V. Attari, R. Arroyave, and S. R. Kalidindi. Application of a chained-ANN for learning the process–structure mapping in $Mg_2Si_xSn_{1-x}$ spinodal decomposition. *Integrating Materials and Manufacturing Innovation*, 2022
- **C. Kelly** and S. R. Kalidindi. Recurrent localization networks applied to the Lippmann-Schwinger equation. *Computational Materials Science*, 2021. ISSN 0927-0256
- **C. Kelly**, N. Olsen, and D. Negrut. Billion degree of freedom granular dynamics simulation on commodity hardware via heterogeneous data-type representation. *Multibody System Dynamics*, 2020
- M. Rakhsha, **C. Kelly**, N. Olsen, R. Serban, and D. Negrut. Multibody dynamics versus fluid dynamics: Two perspectives on the dynamics of granular flows. *Journal of Computational and Nonlinear Dynamics*, 2020

## Additional Involvement

- **GT Grad Pride** (Spring 2020 – Spring 2024). Served on committees and as President, organized social and public outreach events, coordinated cross-organization collaborations, and oversaw constitutional amendment process.
- **Pride Peers** (Fall 2023 – Spring 2024). Mentored junior LGBTQ+ graduate students.
- **Grad Groups** (Fall 2020). Co-led a support and orientation group for first-semester graduate students, including organizing social events and preparing discussion materials.
- **Wisconsin Singers** (Fall 2015 – Fall 2017): Played saxophone in band and managed company website.