

# ARTHUR CAMPELLO

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## EDUCATION

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### Stanford University

Student in Applied Physics PhD Program

*August 2020 - Present*

### Cornell University

BA in Physics and Economics

*August 2016 - May 2020*  
Physics: 3.90, Economics 3.81, Overall 3.71

Thesis: Simulation of Thermal Flow in CMS Phase-II Detector

## PUBLICATIONS

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### Confirmation and variability of the Allee effect in *Dictyostelium discoideum* cell populations, possible role of chemical signaling within cell clusters

Segota, Edwards, **Campello**, Rappazzo, Wang, et al. 2022. *Physical Biology*, vol. 19 (link)

### Testing for the continuous spectrum of x rays predicted to accompany the photoejection of an atomic inner-shell electron

Jacobson, Rasovic, **Campello**, Goddard, Dykes, et al. 2021. *Physical Review A*, vol. 104 (link)

### A Simple Sample-Changing Robot for Grazing-Incidence X-ray Scattering

Garson, **Campello**, Stein, and Smilgies. 2020. *Journal of Applied Crystallography*, vol. 53 (link)

### Bragg Diffraction Transmission Microscopy Using Highly-Monochromated X-rays

Stoupin et al. 2018. *Advances in X-ray Analysis*, vol. 61, pages 205-210. (preview link)

## EXPERIENCE

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### Stanford Institute for Materials and Energy Science

Graduate Research Assistant

*June 2020 - Present*

- Performing pump-probe time-resolved angle-resolved photoemission spectroscopy (ARPES) experiments on novel energy-relevant materials, including topological insulators and high-temperature superconductors
- Developing instrumentation for next generation pump-probe time-resolved ARPES experiments, expanding toward high-photon-energy probe pulses and terahertz-frequency pump pulses

### Cornell Laboratory of Accelerator Sciences and Education

Undergraduate Research Assistant

*January - August 2017, May 2018 - May 2020*

- Participating heavily in mechanics research and development for the Phase-II upgrade of the CMS experiment at CERN through thermal numerical modelling, thermal lab testing, and 3D-modelling of components in the forward pixel detector array; this work will be the basis for my thesis
- Developed learning-based approach to optimizing magnet parameters for resonant positron extraction from Cornell's Synchrotron Source for potential dark photon detection experiment; before these simulations it was unknown whether extraction would be possible
- Co-wrote program to calculate energy-time-intensity output of proposed CBETA-based inverse Compton backscattering photon source; the beam-line has since received funding from NYSERDA

## SLAC National Accelerator Laboratory

Research Support Intern

*May 2019 - August 2019*

- Numerically simulated nonlinear electron-x-ray interactions for crossing X-ray free electron laser (XFEL) future beamline at the Linear Coherent Light Source (LCLS-II); this will be the first ever crossing XFEL beam-line of its category and I was invited to the High Power Laser Workshop at SLAC to discuss my findings
- Developed code to numerically simulate the creation of two-color x-ray beams from electron beams created by superconducting accelerators traveling through undulators of different gaps for the same future beamline

## Cornell Laboratory of Atomic and Solid State Physics

Undergraduate Research Assistant

*August 2016 - May 2018*

- Developed and implemented procedure involving 3D printed tools for creating free-standing 40nm copper films of substantial diameters to use as samples for atomic research at CHESS; this limit is below that found in current literature
- Contributed to experiments in biophysics relating cell proliferation rate changes to the Allee effect and assisted with a composition of a corresponding academic article (working paper)

## Cornell High Energy Synchrotron Source

Mechanical Design Intern

*June 2015 - August 2016*

- Designed and assembled automated sample changing robot for D-Line goniometer; this dramatically reduced sample-changing times for several user groups and occasioned a paper publication
- Formulated ray traces and helped design and assemble components for X-Ray Raman Spectrometer (link to CHESS Newsletter Issue No. 29)
- Designed, modeled, assembled, and helped install C-Line Edge-on Diamond Video Beam Position Monitor (link to CHESS Newsletter Issue No. 28)

## INVITED TALKS

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### High Power Laser Workshop, SLAC National Laboratory

*September 2019*

Modeling Crossing XFEL Beam Radiation (agenda link)

### CLASSE Student Seminar, CHESS

*November 2018*

Quantifying Diamond Defects with Paired Analytic Methods (event link)

### National Science Foundation Site Visit, Cornell University

*April 2018*

Intra-Atomic Bremsstrahlung Experiment

## AWARDS, HONORS, AND DISTINCTIONS

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Undergraduate Teaching Assistant Award, Cornell University Dept. of Physics

*June 2020*

Arts and Sciences Dean's List, Cornell University

*4 out of 8 semesters*

Induction into Omicron Delta Epsilon Economics Honors Society

*October 2019*

Best Poster Presenter, Ivy League Undergraduate Research Symposium

*April 2019*

## TECHNICAL SKILLS

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### Coding

Python, MATLAB, C++, Java, JavaScript, R

### Software

Autodesk Inventor, ANSYS, L<sup>A</sup>T<sub>E</sub>X, STATA

### Operational

Full machine shop training, Microscopic wire-bonding

## TEACHING

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### Undergraduate Teaching Assistant Assignments

PHYS 3317: Applications of Quantum Mechanics

*Fall 2019*

PHYS 2214: Oscillations, Waves, and Quantum Physics

*Fall 2018, Spring 2019*

PHYS 1112: Mechanics and Heat

*Spring 2018*

## LANGUAGES

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**Portuguese** Native fluency

**English** Native fluency

**Spanish** Strong fluency

## WORKING PAPERS

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### Efficient Parameter Posterior Sampling of Regressions on Bounded Variables using High-Dimensional Dirichlet Processes

Arthur Campello, to be submitted in *Computational Statistics and Data Analysis*

## POSTER PRESENTATIONS

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### Modeling the New TXI: Numerical Predictions

Intern Research Presentation Meeting, SLAC National Accelerator Laboratory

*July 2019*

### Quantitative X-ray Topography of Novel Defects in Diamond

Undergraduate Ivy League Research Symposium, University of Pennsylvania

*April 2019*