Graham Van Goffrier

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grahamvangoffrier.com

A passionate student physicist with broad experience across fundamental particles, mathematical theory, sensor devices, and computation. Contributed to research efforts in collaborations on interdepartmental and international scales. A dedicated leader focused on energizing professional development and community outreach.

Skills:

- Scientific Communication, Written and Spoken
- Mathematical Tools for Physics
- Data Analysis and Interpretation
- Scientific Computing
- Team Leadership and Project Management
- Assisting Instruction for Physics and Engineering
- Global Collaboration
- Electronics Design and Testing
- Language Acquisition
- Mathematical Puzzles, from Rubik's Cubes to Putnam problems

Research and Work Experience:

2018: UMaine Summer Research: developing visualization of closed string solutions, including cusps and kinks, with Prof. Neil Comins.

UMaine EE, Teaching Assistant: Grading problem sets, proctoring exams, and advising laboratory work in Electronics II (discrete electronics).

2017: UMaine/National Science Foundation, Research Assistant: Adapting GCM climate models for exoplanet simulation, with Prof. Neil Comins, into 2018.

CERN, ATLAS-ttH Summer Student: Research project on the use of FOAMs for Monte-Carlo event generation, with Prof. Tancredi Carli and Alexander Held, sponsored by UM-CERN-REU and NSF.

UMaine EE, Teaching Assistant: Hosting workshops and conducting mock interviews for Technical Writing courses.

2016: UMaine Physics Capstone Project: Investigating correlation between minimal surfaces and relativistic string solutions, with Prof. Neil Comins; preceded by summer of independent background study in introductory string theory.

UMaine EE, Teaching Assistant: Supported Circuits students with exam prep.

UMaine Summer Research: Investigation of novel deep-learning strategies for application in context-based reasoning systems, with Prof. Roy Turner.

UMaine Summer Research: Theoretical analysis and simulation of confocal optics, contributing to adaption of FPALM super-resolution microscopy technique for molecule orientation detection, with Prof. Sam Hess.

UMaine EE, Teaching Assistant: Assisted with two lab sections of Intro to Programming for Engineers, supported students with writing/testing code.

2015: UMaine EE, Research Assistant: Employed MATLAB to model the properties of Surface Acoustic Wave (SAW) devices, with Prof. Mauricio da Cunha.

UMaine Physics, Teaching Assistant: Taught lab section for second-semester physics, including grading lab reports, guiding students during class, and helping with lab setup.

UMaine EE, Teaching Assistant: Assisted lab sections, supporting students with surface-mount soldering and writing/testing code.

2014: Gordon Insurance, Social Media and Web Engineer: Managed social media, blog, and email promotion, and supported other marketing efforts.

Target Marketing, Office Assistant: Supported database and resource research for pre-university website offering STEM career information.

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Education:

University of Cambridge, pursuing MASt Applied Mathematics, 2018-2019

University of Maine, Orono, M.S. Electrical Engineering (GPA 4.00/4.00), 2017-2018

University of Maine, Orono, B.S. Physics (GPA 4.00/4.00), 2014-2018

- Class of 2018 Valedictorian, *summa cum laude*, Phi Beta Kappa
- Minors: Mathematics, Electrical Engineering, Nanotechnology

Achievements:

- Applied FOAM (cellular model of probability distribution) to ttbar process phase-space with varied complexity of decay chains, including novel visualization/debugging tools, while summer student at CERN.
- Studied examples of correspondence between bosonic string worldsheets and complex Euclidean minimal surfaces, and implemented visualization tool for examining open- and closed-string worldsheets with arbitrary mode expansions.
- Taught lab section of 24 students for introductory electromagnetics, including in-class instruction and providing feedback on reports, and assisted students with projects for several electrical engineering labs.
- Supported continued growth of SPS UMaine Chapter over two years as vice president, including attendance of 7 members to PhysCon in San Francisco, and numerous community physics outreach initiatives.
- Led growth of IEEE Student Branch during year as president, including expansion of the student-run ECE department food store, conference attendance, and first-ever branch participation in IEEE Day festivities.
- Developed MATLAB software to simulate the frequency response of surface-acoustic wave (SAW) devices of arbitrary geometries, providing foundation for further sensor research.

Research Grants:

- Center for Undergraduate Research (CUGR) Research Fellowship, 2016-2017, for work in string theory with Prof. Neil Comins.

Publications:

- University of Maine, “Investigating a Correlation between Minimal Surfaces and Relativistic String Dynamics,” with Prof. Neil Comins (under review)
- CERN Document Server, “FOAM Approximation of ttH Phase-Space Distributions for Monte-Carlo Generation,” Aug 2017
- PhysCon 2016, “Learning the True Meaning of ‘Fellowship,” Nov 2016

Awards:

- Valedictorian, University of Maine, 2018
- Goldwater Scholar, 2017
- UMaine Dean’s List and President’s Scholarship, all semesters
- UMaine Departmental Scholarships (Physics, Engineering, and Alumni) 2014-2018
- Putnam Mathematical Competition, UMaine High Scorer, 2015-2016
- IEEE XTreme 24-hour Coding Competition, 2nd-place team in Region 1, 2016
- IEEE Region 1 Ethics Competition, Co-winner, 2015
- National Merit Scholarship Recipient, 2014

Leadership Positions and Involvement:

- University of Cambridge, elected as the 2019 Graduate Student Representative to the Council of the School of Physical Sciences
- SPS, UMaine Chapter (2014-2018), served as President
- IEEE, UMaine Student Branch (2014-2018), served as President
- IEEE-HKN UMaine Chapter (2016-2018), served as Vice President
- Tau Beta Pi Maine Alpha Chapter (2016-2018), served as President
- UMaine Complex Leadership Council (2014-2016)
- UMaine Cube Society (2014-2016), President/Founder
- UMaine Figure Skating Club (2015-2016), served as Secretary

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Affiliations:

- AMS (American Mathematical Society)
- APS (American Physical Society)
- EPS (European Physical Society)
- Golden Key International Honor Society
- IEEE HKN (IEEE Eta Kappa Nu, Electrical/Computing Engineering Honor Society)
- IOP (Institute of Physics)
- LMS (London Mathematical Society)
- PBK (Phi Beta Kappa)
- PKP (Phi Kappa Phi)
- SIAM (Society for Industrial and Applied Mathematics)
- Sigma Pi Sigma Physics Honor Society
- TBP (Tau Beta Pi, Pan-Engineering Honor Society)

Community Service:

- UMaine Consider Engineering Program Volunteer (2014, 2016, 2018)
- SPS and TBP, Maine Day Campus Clean-up Activities (2015-2018)
- SPS, Introductory Course Support Session Coordinator (2014-2018)
- UMaine Engineering Job Fair/Engineering Expo Volunteer (2014-2018)
- UMaine Middle School Engineering and Physics Events Volunteer (2015-2016)
- UMaine Physics Elementary Education Camp Volunteer (2014)

Coursework:

University of Cambridge Fall 2018:

- Quantum Field Theory
- Symmetries, Fields, and Particles
- General Relativity
- Algebraic Topology

UMaine Spring 2018:

- General Relativity
- Electromagnetic Theory
- Solid State Physics I

UMaine Fall 2017:

- Capstone Project Build
- Random Variables and Stochastic Processes
- Microelectronic Devices I
- Wave Propagation
- Quantum Mechanics II [Quantum Information Theory]

UMaine Spring 2017:

- Microcomputer Architecture
- Electronics II
- Capstone Project Design
- Digital Signal Processing
- Statistical Mechanics

UMaine Fall 2016:

- Digital Logic and Verilog
- Signals and Systems
- Electronics I
- Engineering Writing II
- Physics Career Prep
- Senior Capstone Project

UMaine Spring 2016:

- Astrophysics
- Electrical Networks Lab
- Engineering Writing I
- Independent Research Project
- Modern Experimental Physics Lab
- Electricity and Magnetism II
- Quantum Mechanics I

UMaine Fall 2015:

- Electricity and Magnetism I
- Quantum and Atomic Physics
- Nuclear Physics
- Mathematical Methods in Physics
- Statistics

UMaine Summer 2015:

- Public Communication

UMaine Spring 2015:

- Electric Circuits
- Microelectronics Science and Engineering
- Physics Career Preparation
- Special Relativity
- Special Relativity Lab
- Physical Measurement Lab II
- Mechanics

UMaine Fall 2014:

- Intro to ECE
- Intro to Nanoscale Science and Engineering
- Partial Differential Equations I
- Intro Physics and Astronomy
- Physical Measurement Lab I
- Intro Quantum Physics

References:

- Professor Neil Comins, Physics, Research Advisor, University of Maine (galaxy@maine.edu)
- Professor Tancredi Carli, Physics Coordinator, ATLAS Experiment at CERN (Tancredi.Carli@cern.ch)
- Professor John Thompson, Physics, Department Chair, University of Maine (thompsonj@maine.edu)
- Professor Mauricio da Cunha, Electrical Engineering, LASST, University of Maine (mdacunha@maine.edu)