

Marcus J Daum

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SYNOPSIS Marcus Daum is currently a graduate student at the Georgia Institute of Technology working with Dr. Martin Mourigal on geometrically-frustrated, magnetic systems. He completed a Bachelor of Science in Physics at George Mason University in Fairfax, VA. There he worked in Dr. Robert Cressman's non-linear dynamics lab studying phase transitions in electroconvecting liquid crystals. While completing his coursework, he also tutored high school students in Calculus and Physics. After graduating, he worked at Voices Vote Now as a database analyst creating data reports on multi-million row tables of voter registration data. Long term goals include completing his PhD at Georgia Tech while gaining professional experience outside of the collegiate sphere working in a government or industry run laboratory.

EDUCATION **Georgia Institute of Technology**, Atlanta, GA

Graduate Student, Physics, August 2015 to present

- *Adviser: Martin Mourigal, Ph.D*
- *Physics Interests: Experimental Condensed Matter Research*

George Mason University, Fairfax, VA

B.S., Physics (Minor in Math), August 2011 to May 2015

- *Magna Cum Laude*
- *College of Science Outstanding Undergraduate Research Award 2015*
- *Dean's List Six Semesters*
- *Undergraduate Research Grant Fall 2013 and Spring 2014*
- *Focus: Non-linear dynamics and chaos during phase transitions*

RESEARCH EXPERIENCE **Graduate Research Assistant** January 2016 to present

Georgia Institute of Technology,
Adviser: Martin Mourigal, Ph.D

- Characterized and coaligned two YbMgGaO₄ single-crystals. With collaborates, performed four different neutron scattering experiments on these crystals at Oak Ridge National Laboratory. Using Horace, spec1d, and Matlab, analyzed neutron scattering data. Prepared figures for publication.
- Successfully grew and characterized K_xRhO₂ single crystals using XRD, heat capacity, and magnetization.
- Developed methods to measure heat capacity and magnetization of air-sensitive C₆Eu single-crystals. Performed these measurements.

Undergraduate Research Assistant June 2013 to August 2015

Krasnow Institute for Advanced Study,
George Mason University
Adviser: John Robert Cressman, Ph.D

- Created liquid crystal samples from ITO-coated glass and N-(4-Methoxybenzylidene)-4-butylaniline (MBBA) by chemically etching the glass, sealing the sample, and adding electrodes.
- Designed and built electronic circuits with a lock-in amplifier, liquid crystal sample, oscilloscope, and high-speed camera to be used to take simultaneous electrical and optical measurements.
- Mentored two undergraduate students working on individual projects.

PUBLICATION J. A. M. Paddison, **M. Daum**, Z. L. Dun, G. Ehlers, Y. Liu, M. B. Stone, H. D. Zhou, and M. Mourigal. "Continuous excitations of the triangular-lattice quantum spin liquid YbMgGaO₄" *Nature Physics* **13**, 117-122 (2016)

PRESENTATIONS 5th Annual OSCAR Celebration of Excellence, May 2015
An Explanation of Electroconvection and Phase Transitions, Fairfax, VA (Invited Talk)

67th Annual Meeting of the APS Division of Fluid Dynamics, *Evolution of Power and Structure in an Electroconvective Transition*, San Francisco, CA (Talk) November 2014

27th National Conference on Undergraduate Research, *Electroconvecting Liquid Crystals and a Study of the Transition to Chaos*, Lexington, KY (Talk) April 2014

66th Annual Meeting of the APS Division of Fluid Dynamics, *Oscillations in Power and Structure During the Transition to Defect Turbulence*, Pittsburgh, PA (Talk) November 2013

SPACS-NRL Research Symposium, *Phase Transitions of Electroconvecting Liquid Crystals*, Fairfax, VA (Poster) November 2013

RELEVANT WORK **Database Programmer and Analyst** May 2015 to August 2015
EXPERIENCE

Voices Vote Now (VVN)
Supervisor: Michael Agosta

- Updated and managed multi-million row tables in MySQL of voter registration data. Ran complex queries on these tables to prepare company-wide reports.
- Developed, optimized, and automated scripts and protocols for large scale database migrations.
- Managed and continued to develop a library of Perl and SQL scripts for reporting, data targeting and analysis.
- Worked with a postgres database to handle geo-data with the postgis plugin.

Personal Tutor November 2012 to August 2015
Akari Tutoring
Supervisor: Tran Pham

REFERENCES Available upon request