Third Conference on Laboratory Instruction
Beyond the First Year of College

Loyola University Maryland
July 25-27, 2018

Welcome to Baltimore for the Third Conference on Laboratory Instruction Beyond the First Year (BFY III)! The theme of this conference -- "3D Physics: Integrating Experiment, Theory, and Computation" -- builds on the theme of the 2015 BFY conference, and we hope that you leave here with some ideas of how to construct great laboratory experiences for your students that integrate theory and computation. The conference programming is designed to provide hands-on learning experiences and to stimulate dialog and idea-generation that you can ultimately implement in your lab curricula to help students develop a range of transferrable skills and deepen their understanding of physics and laboratory practices.

Another important aspect of this conference is community building. ALPhA is committed to providing a diverse, inclusive, and welcoming community where scientific and educational innovation, especially related to the advanced lab, can thrive. And it is this community, from the members of the organizing committees to the presenters and workshop leaders to the vendors to all of the participants, that makes the BFY conferences successful. As a community, we can keep the discussions going and work together to support and strengthen advanced lab experiences for all of our students. Enjoy your time here at Loyola and take time to connect with others in the advanced lab community.

-- *Joe and Mary*

Thank you to…

Our host institution:

LOYOLA UNIVERSITY MARYLAND

Vendors who are presenting workshops:

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ALPhA's Statement on Diversity

The Advanced Lab Physics Association (ALPhA) recognizes that scientific and educational excellence and innovation are best achieved in a diverse, inclusive community where different perspectives can be shared and integrated. Therefore, ALPhA is committed to increasing access to advanced laboratory experiences and the development of transferable skills throughout the laboratory curriculum for all physics students regardless of race, ethnicity, age, gender identity or expression, ability status, personal appearance, sexual orientation, national origin, immigrant status, religion, medical condition, ancestry, marital status, political affiliation, educational background, and military or veteran status.

Wednesday, July 25

Registration		**7:30-8:30 a.m.** **Knott Hall B01**
Opening Remarks *Joe Kozminski (Lewis University) & Mary Lowe (Loyola University Maryland), BFY III co-chairs*		**8:15-8:30 a.m.** **Knott Hall B03**
Session I: Plenary Session		**8:30-9:30 a.m.** **Knott Hall B03**
Invited Talk: "Optics and Lasers Advanced Laboratories" *Chad Hoyt (Bethel University, Honeywell)*	8:30-9:00 a.m.	
Invited Talk: "Instructors' Values and Practices Are Integral to PER in Labs" *Dimitri R. Dounas-Frazer (University of Colorado Boulder)*	9:00-9:30 a.m.	
Session II: Facilitated Networking Session and Coffee Coffee break sponsored in part by Qubitekk, Inc. and the American Association of Physics Teachers (AAPT)		**9:45 -10:45 a.m.** **McGuire Hall,** **2nd Floor Student Center**
Session III: Poster Session I		**10:45 -11:45 a.m.** **McGuire Hall**
Lunch Sponsored in part by Spectrum Techniques		**11:45 a.m. – 12:30 p.m.** **McGuire Hall**
Session IV: Workshops		**12:45 – 2:20 p.m.** **Various Locations**
Workshop 1 **Workshop 2**	12:45-1:25 p.m. 1:40-2:20 p.m.	**Knott Hall, Donnelly Science Center, TeachSpin Trailer**
Coffee Break Sponsored in part by Keysight Technologies		**2:20-2:50 p.m.** **Donnelly Atrium**
Session V: Workshops		**2:50 – 4:25 p.m.** **Various Locations**
Workshop 3 **Workshop 4**	2:50-3:30 p.m. 3:45-4:25 p.m.	**Knott Hall, Donnelly Science Center, TeachSpin Trailer**
Coffee Break		**4:25-4:55 p.m.** **Donnelly Atrium**
Session VI: Workshops		**4:55 – 6:30 p.m.** **Various Locations**
Workshop 5 **Workshop 6**	4:55-5:35 p.m. 5:50-6:30 p.m.	**Knott Hall, Donnelly Science Center, TeachSpin Trailer**
Dinner Sponsored in part by PASCO Scientific		**6:45-8:00 p.m.** **McGuire Hall**

Thursday, July 26

Session VII: Plenary Session		**8:00-9:30 a.m.** **Knott Hall B03**
Invited Talk: "Give, Take, and Connect: The AAPT Laboratory Recommendations as a Framework for Community Progress" *Ernest Behringer (Eastern Michigan University)*	8:00-8:30 a.m.	
Invited Talk: "Implementing Computation Across the Curriculum" *Todd Zimmerman (University of Wisconsin Stout)*	8:30-9:00 a.m.	
Invited Talk: "Case Study on How to Develop 3D Labs with Theoretical, Experimental, and Computational Goals" *Ashley Carter (Amherst College)*	9:00-9:30 a.m.	
Coffee Break		**9:30 -10:00 a.m.** **Donnelly Atrium**
Sponsored in part by Nanosurf, Inc.		
Session VII: Workshops		**10:00 – 11:35 a.m.** **Various Locations**
Workshop 7	10:00-10:40 a.m.	**Knott Hall, Donnelly Science**
Workshop 8	10:55-11:35 a.m.	**Center, TeachSpin Trailer**
Lunch		**11:35 a.m. – 12:30 p.m.** **On the Green**
Sponsored in part by Klinger Educational Products		
Session VIII: Workshops		**12:35 – 2:10 p.m.** **Various Locations**
Workshop 9	12:35-1:15 p.m.	**Knott Hall, Donnelly Science**
Workshop 10	1:30-2:10 p.m.	**Center, TeachSpin Trailer**
Coffee Break		**2:10-2:40 p.m.** **Donnelly Atrium**
Sponsored in part by Liquid Instruments		
Session IX: Workshops		**2:40 – 4:15 p.m.** **Various Locations**
Workshop 11	2:40-3:20 p.m.	**Knott Hall, Donnelly Science**
Workshop 12	3:35-4:15 p.m.	**Center, TeachSpin Trailer**
Session X: Parallel Breakout Sessions		**4:30-5:20 p.m.** **Various Locations** **Knott Hall, Donnelly Science Center, Sellinger**
Session XI: Poster Session II / Hors d'oeuvres		**5:30 – 6:45 p.m.** **McGuire Hall,** **2nd Floor Student Center**
Sponsored in part by Photron		
PIRA Demo Show		**7:00-8:00 p.m.** **Knott Hall B03**

Friday, July 27

Breakfast Round Tables Sponsored in part by PASCO Scientific	**8:00-8:45 a.m.** **McGuire Hall,** **2nd Floor Student Center**
Session XII: Plenary Session	**8:45 -9:45 a.m.** **McGuire Hall**
Invited Talk: "Experimental Design in Curricular Laboratories" *Melissa Eblen-Zayas (Carleton College)*	8:45-9:15 a.m.
Invited Talk: "Pop-up Classes: A Non-Traditional Way to Introduce Technical Skills" *Linda Barton (Rochester Institute of Technology)*	9:15-9:45 a.m.
Session XIII: Hot Topics Plenary Session	**10:00 – 11:00 a.m.** **Knott Hall B03**
Invited Talk: "Quantitative Analysis of Fraunhofer Diffraction Patterns: An Exercise in Model Fitting, Optics, and Electronics" *Jerome Fung (Wellesley College)*	10:00-10:15 a.m.
Invited Talk: "Building a Low-Cost Earth's Field Nuclear Magnetic Resonance Spectrometer in the Advanced Lab" *Steven Morgan (University of Minnesota Morris)*	10:15-10:30 a.m.
Invited Talk: "Targeting Student Design and Modeling Skills Using Coupled Oscillators" *Bei Cai (Queen's University)*	10:30-10:45 a.m.
Invited Talk: "Mechanical Chaotic Oscillator" *Eric Ayars (California State University Chico)*	10:45-11:00 a.m.
Session XIV: Closing Session "AAPT-ALPhA Award," *Jeremiah Williams (Wittenberg University)* "ALPhA Update," *Elizabeth George (Wittenberg University, ALPhA President)* "Stewardship of Our Community Resources," *Gabe Spalding (Illinois Wesleyan University, Reichert Foundation)* *"Workshop Assessment Survey," Natasha Holmes (Cornell University)* *"Closing Remarks" Joe Kozminski (Lewis University) & Mary Lowe (Loyola University Maryland)*	**11:00 – 11:45 a.m.** **Knott Hall B03**
Boxed Lunch Sponsored in part by Modus Medical Devices	**11:45 a.m. – 12:30 p.m.** **Donnelly Atrium**
Conversations with Vendors	**12:30 – 4:00 p.m.** **Various Locations** **Knott Hall, Donnelly Science Center, TeachSpin Trailer**

Session III: Poster Session I

Wednesday, July 25
McGuire Hall, 2nd Floor Student Center
10:45 – 11:45 a.m.

P01 **The Impacts of ALPhA's Laboratory Immersion Program**
Lowell McCann, University of Wisconsin River Falls

P02 **Acting Like an Experimentalist: Transforming Post-lab Reports into In-lab Notebooks**
Greg Severn, University of San Diego

P03 **Developing a Laboratory Practice Assessment for the Design, Analysis, Tools, and Apprenticeship (DATA) Laboratory**
Rachel Henderson, Kelsey M. Funkhouser, Marcos D. Caballero, Michigan State University

P04 **Targeting Student Design and Modeling Skills Using Coupled Oscillators**
Alastair McLean, William Kim, Matt Frosst, Bei Cai, Queen's University

P05 **The Covariance Matrix and Jacobian in Error Propagation**
Robert DeSerio, University of Florida

P06 **Physics Experiment Teaching Integrated with Virtual-reality Technology**
Yan Cen, Fudan University

P07 **Modeling the Effect of Air Intake Aperture Size on the Muzzle Velocity of a Ping Pong Ball Cannon**
Derek Thuecks, Washington College

P08 **Apparatus for Measuring the Speed of an Electrical Signal in a Coaxial Cable**
Mark Masters, Anna Patterson, Purdue University Fort Wayne

P09 **Development of a High-resolution Time Coincidence Counter Using a Cypress PSoC Chip**
Eric Ayars, Cal State University Chico

P10 **Examining Student Understanding of Bipolar-Junction Transistor Circuits***
Kevin L Van De Bogart, MacKenzie R. Stetzer, University of Maine
*This material is based upon work supported by the National Science Foundation under Grant Nos. DUE-0618185, DRL-0962805, DUE-1022449, and DUE-1323426.

P11 **Musical Acoustics Demos with an Impedance Probe**
Herbert Jaeger, Miami University

P12 **Physics Experiments for an Introductory Electronics Course**
Everett Ramer, Edmund Nowak, University of Delaware

P13 **Teaching Self-Reliance in the Electronics Lab: One Approach**
Michelle Milne, St. Mary's College of Maryland

P14 **Using Arduinos for Interdisciplinary Student Projects**
Will Roach, Lynchburg College

P15 **Initial Impacts of the Transformation of a Large Introductory Lab Course Focused on Developing Experimental Skills and Expert Epistemology**
Heather J. Lewandowski, Daniel Bolton, Benjamin Pollard, University of Colorado Boulder / JILA

P16 **What Counts in Laboratories: Toward a Practice-based Identity Survey**
Kelsey Funkhouser, Marcos D. Caballero, Paul W. Irving, Vashti Sawtelle, Michigan State University

P17 **Student Ownership of Laboratory Projects and Attitudes about Experimental Physics**
Dimitri R. Dounas-Frazer, Heather J. Lewandowski, University of Colorado Boulder/ JILA

P18 **A New Photon Lab: Mimicking Eve in Quantum Key Distribution**
Enrique J. Galvez, Baibhav Sharma and Aayan Bista, Colgate University

P19 **Experimental Quantum Mechanics**
Stephanie Rosenthal, Marisol Beck, Qubitekk, Inc.

P20 **New Developments of DeskCAT ™: A Multi-Slice Optical Scanner for Teaching CT and SPECT Imaging Principles**
J.J. Battista, Modus Medical Supply, Inc.; K. Jordan, London Regional Cancer Program, LHSC and University of Western Ontario; L. Kaci, London Regional Cancer Program, LHSC; J. Miller, Modus Medical Devices Inc; J. Dietrich, Modus Medical Devices Inc.

Session X: Breakout Session

Thursday, July 26
4:30 – 5:20 p.m.

B01 **Assessment in BFY courses** – Heather Lewandowski (Univ. of Colorado) presiding, *Sell 001*

B02 **BFY Labs in Biophysics** – Nancy Forde (Simon Fraser University) presiding, *Sell 003*

B03 **BFY Labs in Electronics** – David Van Baak (TeachSpin) presiding, *KH 303*

B04 **BFY Labs in Optics** – Vanessa Preisler (Univ. of La Verne) presiding, *DS 332*

B05 **Five Instruments Every Physics Major Should Know** – Jonathan Reichert (TeachSpin) presiding, *KH 311*

B06 **Funding and Advanced Labs on a Budget** – Gabe Spalding (Illinois Wesleyan) presiding, *Sell 005*

B07 **"Job Training" in the Advanced Lab with an Advanced Electronics Curriculum** – Eric Black (Cal Tech.) presiding, *Sell 006*

B08 **Maker Spaces and BFY Labs** – Mark Freeman (Univ. of Alberta) presiding, *Sell 008*

B09 **Modeling and Computation in BFY Labs I** – Norman Chonacky (PICUP, Yale Univ.) presiding, *Sell 104*

B10 **Modeling and Computation in BFY Labs II** – Todd Zimmerman (PICUP, Univ. of Wisc. Stout) presiding, *Sell 105*

B11 **Open Ended Projects in the Advanced Lab** – Rob Knobel (Queens Univ.) presiding, *Sell 102*

B12 **Scaffolding Experiments in Advanced Labs** – Lowell McCann (Univ. of Wisc. River Falls) presiding, *Sell 107*

B13 **Structuring BFY Labs to Meet Course Goals** – Anne Cox (Eckerd College) presiding, *Sell 201*

B14 **Teaching Uncertainty and Statistical Analysis** – Bob DeSerio (Univ. of Florida) presiding, *Sell 203*

B15 **Teaching Written and Oral Communication Skills in BFY Labs** – Ashley Carter (Amherst College) presiding, *Sell 221*

B16 **Tips for Faculty New to Teaching in the Advanced Lab** – Melanie Lott (Denison Univ.) and Bo Polak (Loyola Univ. Chicago) presiding, *Sell 223*

Session XI: Poster Session II

Thursday, July 26
McGuire Hall, 2nd Floor Student Center
5:30 – 6:45 p.m.

P21 **A Large Scale, Problem Based, Advanced Experimental Physics Lab Program**
Lars Hellberg, Chalmers University of Technology

P22 **BSY (Beyond Sophomore Year) Labs without an Advanced Lab class?**
Anne J. Cox, Eckerd College

P23 **Lessons Learned from Five Years of Student Self-Directed Experimental Projects in the Advanced Lab**
Ryan Terrien, Melissa Eblen-Zayas, Carleton College

P24 **Challenges with Proposing Causes for Unexpected Experimental Results**
Laura Ríos, Benjamin Pollard, Dimitri R. Dounas-Frazer, Heather J. Lewandowski, University of Colorado Boulder/ JILA

P25 **Think First, Act Later - A Course Structure for Improving Student Designed Experiments**
Nathan Powers, Dallin Durfee, David Allred, Brigham Young University

P26 **Videos in the Intermediate Laboratories**
Nicole Ackerman, Agnes Scott College

P27 **Views about Experimental Physics in a Large Introductory Laboratory Course**
Benjamin Pollard, Heather J. Lewandowski, University of Colorado Boulder/ JILA

P28 **3d Printed Low Budget Spectrographs**
Timothy Grove, Purdue University Fort Wayne

P29 **A Senior Level Lab Demonstrating the Utility of AFM**
Kurt Vandervoort, Cal Poly Pomona

P30 **Building a Low-Cost Earth's Field Nuclear Magnetic Resonance Spectrometer in the Advanced Lab**
Steven W. Morgan, University of Minnesota Morris

P31 **Creating a Nitinol Engine to Study the Thermodynamic Cycle**
Robert D. Polak, Andrew Fischer, Jared Rafferty, Loyola University Chicago

P32 **Graphical Approach to Multi-slit Interference Analysis**
Patricia E Allen, Scott Thomas, Appalachian State University

P33 **Hyperfine Structure in Rubidium**
R. Seth Smith, Francis Marion University

P34 **Introducing Students to Biophysics with a Centrifuge Force Microscope**
Tristan Stark, Mark Freeman, David Fortin, University of Alberta

P35 **Limits of Precision in the Balmer Lines Spectroscopy Lab**
Timothy Roach, College of the Holy Cross

P36 **Low Cost Apparatus for Measuring the Speed of Light**
Ian Bearden, J. Oechsle, M. Mrozowska*, Niels Bohr Institute
*undergraduate student

P37 **Measuring Surface Tension with Capillary Waves**
Jeffrey Wagner, Union College

P38 **Muon Experiments, Beyond the Turnkey**
Brett Fadem, Muhlenberg College

P39 **Polarization Studies of 3D Photonic Crystals Using Transmission and Reflection Experiments**
Shabbir Mian, McDaniel College

P40 **Quantifying Superconductivity Through Magnetic Force-Distance Measurements Using 3D Printers**
Mark Freeman, Tomas Robinson, Miroslav Belov, University of Alberta

P41 **Verifying Moseley's Law with Energy-dispersive X-ray Spectroscopy or X-ray Fluorescence**
Michele McColgan, George Hassel, Chamidu Warnakulasuriya, Tristen Protzmann, Brendan Waffle, Siena College

Workshops

Wednesday, July 25
Thursday, July 26

W01 **Mechanical Chaotic Oscillator** (*KH 004*)
Eric Ayars, Cal State University Chico

W02 **An Advanced Python Data Analysis and Uncertainty Exercise** (*KH 108*)
David Bailey, University of Toronto

W03 **Low Cost Gamma Ray Spectrometers** (*DS 253*)
Ian Bearden, Niels Bohr Institute

W04 **Investigating Hydrodynamic Instabilities Using Table-Top Experiments** (*DS 223*)
Daniel Borrero, Willamette University

W05 **Quantum Harmonic Oscillator Fluorescence** (*KH 004*)
Dan Boye, Davidson College

W06 **Transient Heat Conduction in a Rod: Priceless Skills for $25** (*KH 108*)
Jed Brody, Emory University

W07 **Acoustic Trapping** (*KH 007*)
Ashley Carter, Amherst College

W08 **Chaotic Pendulum** (*KH 108*)
Bob DeSerio, University of Florida

W09 **Paschen's Law Experiment** (*KH 210*)
Arturo Dominguez, Princeton Plasma Physics Lab

W10 **Thermoelectric Effect and Applications-An Electronics 'Final Project' Experiment** (*KH 004*)
Khalid Eid, Miami University

W11 **Particle Physics with Low Cost SiPM Based Detectors** (*DS 155*)
Brett Fadem, Muhlenberg College

W12 **X-Ray Fluorescence & Moseley's Law** (*DS 253*)
Lorcan Folan, New York University

W13 **Fluorescence Correlation Spectroscopy for an Advanced Undergraduate (Biophysics) Lab** (*DS 223*)
Nancy Forde and David Lee, Simon Fraser University

W14 **Quantitative Analysis of Fraunhofer Diffraction Patterns: An Exercise in Model Fitting, Optics, and Electronics** (*DS 053*)
Jerome Fung and Lauri Wardell, Wellesley College

W15 **Single-Photon Experiments and the Quantum Eraser** (*KH 210*)
Kiko Galvez, Colgate University

W16 **Shoebox Spectrographs (Dirt cheap light/spectroscopy labs)** (*KH 006*)
Timothy Grove, Purdue University Fort Wayne

W17 **Data Acquisition Using LabVIEW** (*KH 201*)
Doug Harper, Western Kentucky University

W18 **Uncertainty Propagation in Modern Physics Lab** (*DS 045*)
George Hassel, Siena College

W19 **Measurement of the Acoustic Impedance and Resonance of Air Columns** (*KH 007*)
Herbert Jaeger, Miami University

W20 **Alpha Particle Energy Loss in Air** (*DS 253*)
Robert Knobel and Bei Cai, Queen's University

W21 **Fiber Optics at the Intermediate and Advanced Levels** (*DS 045*)
Mary Lowe, Loyola University Maryland

W22 **Fourier Transform Spectroscopy in the Visible Range** (*KH 201*)
Jenny Magnes, Vassar College

W23 **Detection of Radio Pulsars** (*KH 006*)
Daniel Marlow, Princeton University

W24 **Single Photon Avalanche Detector** (*KH 005*)
Jonathan Newport, American University

W25 **Soap Films: Optics and Colloidal Interactions** (*DS 053*)
Gregory Putman and Elizabeth Mann, Kent State University

W26 **Speed of Light Measurement Using a Pulsed Diode Laser** (*DS 053*)
Timothy Roach, College of the Holy Cross

W27 **Flexible Resources for Supporting Student Conceptual Understanding of Diode Circuits in Electronics Courses** (*KH 201*)
MacKenzie Stetzer, University of Maine

W28 **Thermal Diffusion in Rods** (*KH 005*)
Matthew Sullivan, Ithaca College

W29 **FPGA in the Advanced Lab** (*DS 155*)
Kurt Wick and Kevin Booth, University of Minnesota

W30 **Nuclear and Particle Physics Experiments** (*DS 253*)
Cristina Mattone, Nicola Paoli, CAEN SpA

W31 **Nuclear Imaging Introduction** (*DS 253*)
Cristina Mattone, Nicola Paoli, CAEN SpA

W32 **Entanglion Game and Quantum Optics Demo** (*DS 141*)
Rik van Gorsel, ID Quantique

W33 **Spatial Light Modulator Educational Kit Workshop** (*DS 244*)
Marc Murphy, Joel Yue, Jasper Display Corporation

W34 **Resistivity: 23 Orders of Magnitude on Your Desk, Simplified Van Der Pauw & More** (*DS 244*)
Mark Zimmerman, Keithley Instruments

W35 **Measuring the Dielectric Properties of Materials** (*DS 141*)
Arthur Lizotte, Morgan Allison, Patty Fennell, Keysight Technologies

W36 **Digital Laue Diagrams with an X-ray Apparatus** (*DS 244*)
Ray Saper, Irwin Malleck, Klinger Educational Products; Jay Grube, Werner Bietsch, Leybold

W37 **Moku:Lab for Radio Wave Demodulation and Examples of Feedback Control** (*DS 121*)
Jacob Gamble, Liquid Instruments

W38 **Arduino & MATLAB for Teaching Theory, Experiment, and Computation** (*DS 121*)
Paul Kassebaum, MathWorks

W39 **Medical Imaging hands on Computed Tomography with DeskCAT™ Interactive Lab & Classroom Demonstration Without Irradiating the Students (or Instructor)** (*DS 223*)
John Miller, Susan Campbell, Modus Medical Devices Inc.

W40 **Atomic Force Microscopy in Materials Science: Nanomechanics and Nanotribology** (*DS 221*)
Edward Nelson, Saju Nettikadan, Nanosurf

W41 **Three Effects: Hall, Photoelectric, and Zeeman** (*DS 221*)
Ann Hanks, Jon Hanks, PASCO Scientific

W42 **High-Speed Cameras for Slow Motion Analysis** (*DS 251*)
Jennifer Fenlason, Shane Kirksey, Andrew Bridges, Photron

W43 **High-Speed Polarization Demo** (*DS 251*)
Jennifer Fenlason, Shane Kirksey, Andrew Bridges, Photron

W44 **Classical Mechanics Using Quantum Levitation Flexible Track** (*KH 203*)
Boaz Almog, Eran Tzinamon, Quantum Experience Ltd.

W45 **Superconductivity, Flux Pinning and Levitation** (*KH 203*)
Boaz Almog, Eran Tzinamon, Quantum Experience ltd.

W46 **Quantum Mechanics Workshop** (*DS 251*)
Stephanie Rosenthal and Marisol Beck, Qubitekk, Inc.

W47 **Magnetic Susceptibility and the Periodic Table** (*KH 203*)
David Van Baak, TeachSpin, Inc.

W48 **The Hall Effect and the Sign of Charge Carriers** (*KH 203*)
David Van Baak, TeachSpin, Inc.

W49 **Harmonic Motion, Damped, Driven, and Self-Oscillating** (*KH 203*)
David Van Baak, TeachSpin, Inc.

W50 **Radio-Frequency Spectroscopy by Optical Pumping** (*TeachSpin Trailer*)
George Herold, TeachSpin, Inc.

W51 **Measuring the Elementary Charge *e* via Shot Noise** (*TeachSpin Trailer*)
George Herold, TeachSpin, Inc.

W52 **Earth's-Field NMR and the Proton Magnetic Moment** (*TeachSpin Trailer*)
Jonathan F. Reichert, TeachSpin, Inc.

W53 **Pulsed-NMR Spectroscopy and 1-d Imaging** (*TeachSpin Trailer*)
Jonathan F. Reichert, TeachSpin, Inc.

W54 **Ultra-high Resolution Diode-Laser Spectroscopy** (*TeachSpin Trailer*)
Barbara Wolff-Reichert, TeachSpin, Inc.

W55 **Honing 'Quantum Intuition' with Sound Waves in Confined Geometries** (*TeachSpin Trailer*)
Barbara Wolff-Reichert, TeachSpin, Inc.

W56 **Diode Laser Pumped Nd:YAG Frequency Doubling** (*DS 244*)
Ray Saper, Irwin Malleck, Klinger Educational Products; Jorg Grube, Werner Bietsch, Leybold

ALPhA Event Participation Code of Conduct

1. Introduction

The Advanced Laboratory Physics Association ("ALPhA") is dedicated to providing a safe and productive experience at all ALPhA sponsored events for all event participants, regardless of gender identity, race, color, personal appearance, national origin, religion, age, ability status, medical condition, ancestry, marital status, sexual orientation, or any other basis protected by federal or applicable state laws or local ordinances. (See also ALPhA's Statement on Diversity.) ALPhA does not tolerate discrimination, or any form of unlawful harassment, and is committed to enforcing this Event Participation Code of Conduct (the "Code") at all ALPhA events. As a professional society, the ALPhA is committed to providing an atmosphere that encourages the free expression and exchange of scientific and educational ideas. Furthermore, ALPhA upholds the philosophy of equal opportunity for and treatment of all event participants and staff in any event venue, whether in person or online.

2. Scope of Code

ALPhA requires compliance with the Code by all event participants, staff, guests, and vendors at all official ALPhA conferences, meetings, meeting breakout sessions, tours, and social events as well as at all ALPhA meeting-related events that are expressly sponsored or promoted by ALPhA, whether held in public or private facilities (each may be referred to herein as an "Event" or collectively, as the "Events").

3. Harassment Defined

Unlawful harassment includes verbal, physical, and visual conduct that creates an intimidating, offensive, or hostile environment. Harassing conduct can take many forms and includes, but is not limited to, the following: slurs, epithets, derogatory comments, insults, degrading or obscene words, jokes, demeaning statements, offensive gestures, or displaying derogatory or demeaning pictures, drawings, or cartoons based upon an individual's gender identity, race, color, personal appearance, national origin, religion, age, ability status, medical condition, ancestry, marital status, sexual orientation, or any other basis protected by federal or applicable state laws or local ordinances.

Sexually harassing conduct in particular includes all of these prohibited actions, as well as other unwelcome conduct, such as unwanted sexual advances, whether or not the Event participant submits to the invitation; lewd propositions or innuendos; leering; making sexual gestures; making sexually suggestive or graphic comments or engaging in sexually-oriented conversation; sexually suggestive objects, graphics, pictures, or posters, whether physically displayed in the Event location or accessed over the Internet; making or using derogatory comments, epithets, slurs or jokes; the touching or display of one's own body; or physical touching or assault, as well as impeding or blocking movements.

Sexually harassing conduct can be by a person of either the same or opposite sex. It is unlawful for males to sexually harass females or other males, and for females to sexually harass males or other females. Conduct that begins as consensual in nature may become harassment if one party withdraws his or her consent. Sexual or other harassment prohibited by law is unacceptable and will not be tolerated.

The above is not a complete list of what may be deemed sexual or other unlawful harassment prohibited by law. It is impossible to define every action or word that could be interpreted as harassment. However, ALPhA has a "zero tolerance" policy toward discrimination and all forms of unlawful harassment. ALPhA reserves the right to discipline Event participants who engage in any inappropriate conduct, even if it is not specifically referred to in this Code or is not actionable as sexual or any other form of harassment.

4. Prohibited Conduct

Prohibited conduct at ALPhA Events includes, but is not limited to:

1. harassment based on gender identity, race, color, personal appearance, national origin, religion, age, ability status, medical condition, ancestry, marital status, sexual orientation, or any other basis protected by federal or applicable state laws or local ordinances;
2. demeaning comments or harassment about a person's professional status or qualifications;
3. sexual harassment, as defined in Section 3;
4. abusive conduct that has the purpose or effect of unreasonably interfering with another person's ability to benefit from and enjoy or participate in the Event, including social events related to the Event and sponsored by ALPhA;
5. undue interruption of any Event, speaker, or session; and
6. violence or threats of violence.

5. Reporting an Incident

Event participants or other individuals who witness or experience inappropriate conduct at an Event, including but not limited to the prohibited conduct described above, should report such conduct immediately via the online code of Conduct Incident Report Form. The individual may alternatively report the conduct to ALPhA President Elizabeth George, ALPhA Secretary Ashley Carter, or BFY III co-chair / ALPhA Board Member Joe Kozminski. Anyone experiencing or witnessing behavior that constitutes an immediate or serious threat to public safety at the Event is advised to locate a house phone and call and ask for security. He or she is not required or expected to discuss the concern with the alleged offender.

ALPhA cannot address claimed inappropriate conduct or harassment unless the claims are brought to the attention of ALPhA leadership. Event participants are encouraged to report any incidents as quickly as such participant feels safe doing so. This will help ALPhA decrease incidents of harassment by increasing awareness and allowing for appropriate action.

ALPhA is committed to taking all reasonable steps to prevent harassment and prohibited conduct at its Events, and will make every reasonable effort to promptly and completely address and correct any prohibited conduct that may occur at an ALPhA Event.

The following guidelines for observers or targets of prohibited conduct are provided to help with an investigation. ALPhA will make every effort to maintain the confidentiality of any supporting documentation.

- If possible, write everything down (times, places, nature of the incident, and comments made).
- Save emails, notes, etc.
- Be as detailed as possible.

ALPhA can investigate situations that arise at ALPhA Events and in ALPhA -sponsored online communities provided in connection with such Events. If an Event participant experiences inappropriate conduct or harassment at the participant's own or another institution, at a place of work, at a research facility, or online but not via ALPhA -sponsored channels (e.g., direct emails between parties) that individual should contact the individual at that location or the individual's home institution who handles such issues, such as the Title IX Officer, Dean of Students, Human Resources Director, mental health counselor, etc.

6. Investigation

ALPhA will promptly and impartially investigate the facts and circumstances of any claim of inappropriate conduct or harassment at ALPhA Events, but only with the approval and cooperation of the individual(s) who experienced harassment. ALPhA will make every effort to keep the reporting individual's concerns confidential and will not deliberately share personal information other than to the investigator(s); however, confidentiality cannot be guaranteed (for example, although efforts will be made to reduce the chances, it may be possible to infer something about the person(s) involved based upon the situation under question).

During an investigation, ALPhA or a designated independent consultant subject to obligations of confidentiality, *generally* will do the following (as necessary) to make a determination as to appropriate action:

- document the nature of the complaint;
- interview the complainant;
- conduct further interviews as necessary, such as with witnesses or, at an appropriate time, the alleged offender;
- document ALPhA's findings regarding the complaint;
- document recommended follow-up actions and remedies, if warranted; and
- inform the complainant of ALPhA's findings.

A specific timeline for the investigation cannot be predicted in advance, as it may depend upon the nature of the allegations and the investigation process. Every effort will be made to act upon the investigation in a prompt and timely manner. Upon completion of the investigation, ALPhA will take corrective measures against any person who has engaged in conduct in violation of this policy, if ALPhA determines such measures are necessary.

Notwithstanding, ALPhA reserves the right, upon receipt of a complaint, if in ALPhA's sole reasonable discretion, the nature of such complaint requires the immediate removal of an individual in order to ensure that Event may proceed safely and without undue interruption, to remove an individual without undertaking an investigation as described herein.

7. Disciplinary Action

If ALPhA determines that an individual has engaged in prohibited conduct, ALPhA shall determine the appropriate action to be taken, which may include, but is not limited to:

- private reprimand;
- removal from the Event without warning or refund;
- implementation of conditions upon attendance at future ALPhA Events; or
- restriction from attendance at future ALPhA Events.

ALPhA may, but is not required to, report any incident to proper authorities, including but not limited to law enforcement, if in ALPhA's sole discretion such reporting is advisable or necessary. If ALPhA determines that an individual has engaged in prohibited conduct at an ALPhA Event, and such individual is an ALPhA member, ALPhA may consider suspension or termination of ALPhA membership solely in compliance with any member disciplinary or termination procedures adopted by ALPhA that provide the member, at a minimum, the rights of notice, a hearing, and a right to appeal any adverse decision.

8. Retaliation Is Not Tolerated

Retaliation for complaints of inappropriate conduct or harassment are also considered harassment and will not be tolerated. Retaliatory behavior in connection with ALPhA Events will be investigated in a similar manner to initial complaints.

Adapted from the American Association of Physics Teachers (AAPT) Event Participation Code of Conduct. Adopted by the ALPhA Officers and Board of Directors on July 13, 2018.

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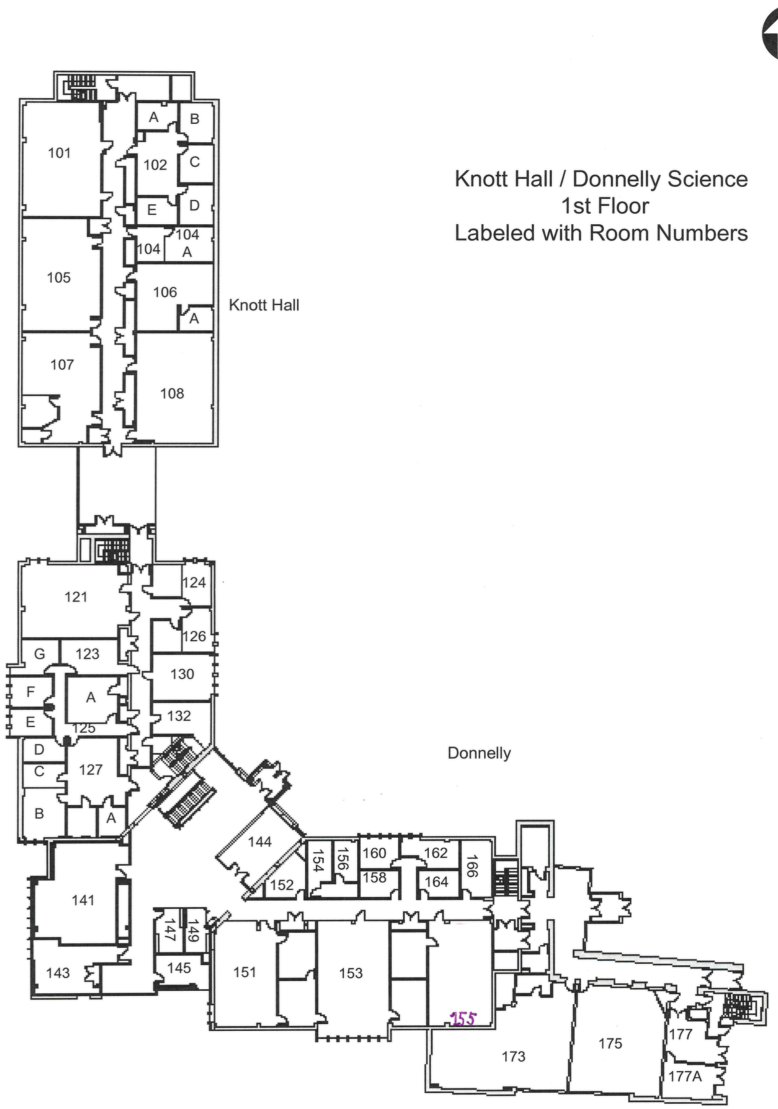
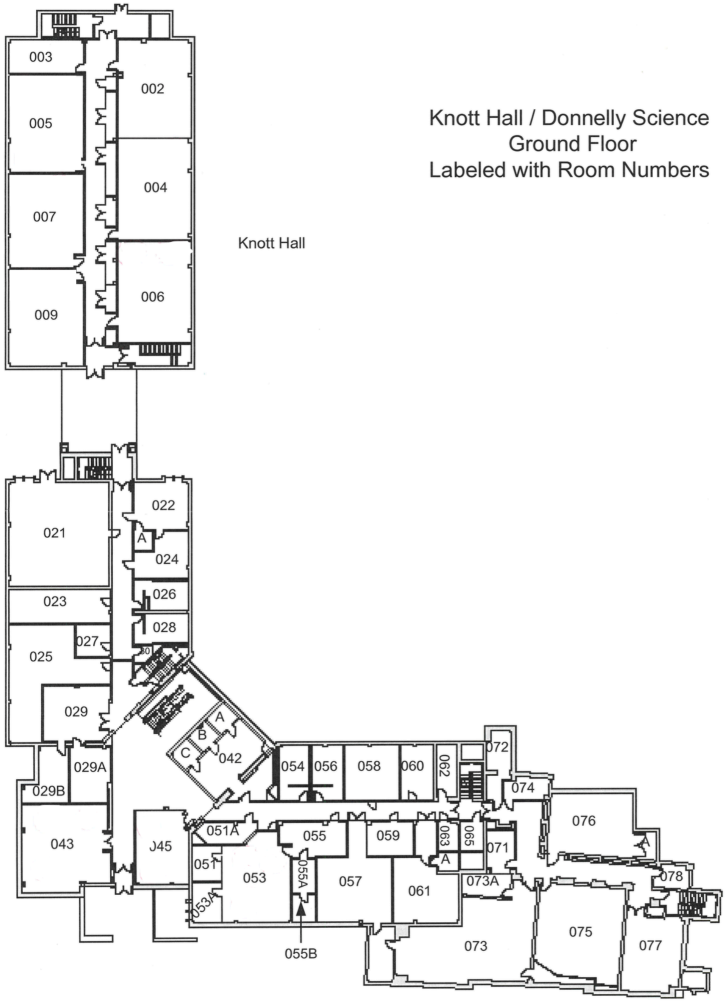
Benjamin Zwickl	Rochester Institute of Technology	ben.zwickl@rit.edu

Knott Hall / Donnelly Science
1st Floor
Labeled with Room Numbers



Revised by EHS
11/14/2012 cnr

Knott Hall / Donnelly Science
Ground Floor
Labeled with Room Numbers



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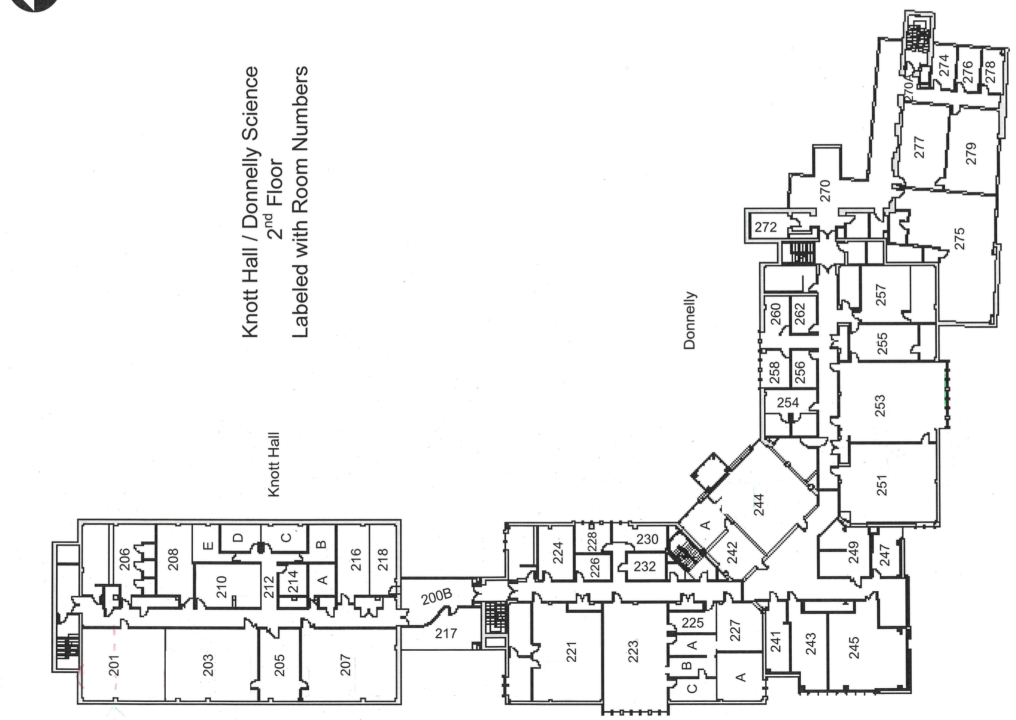
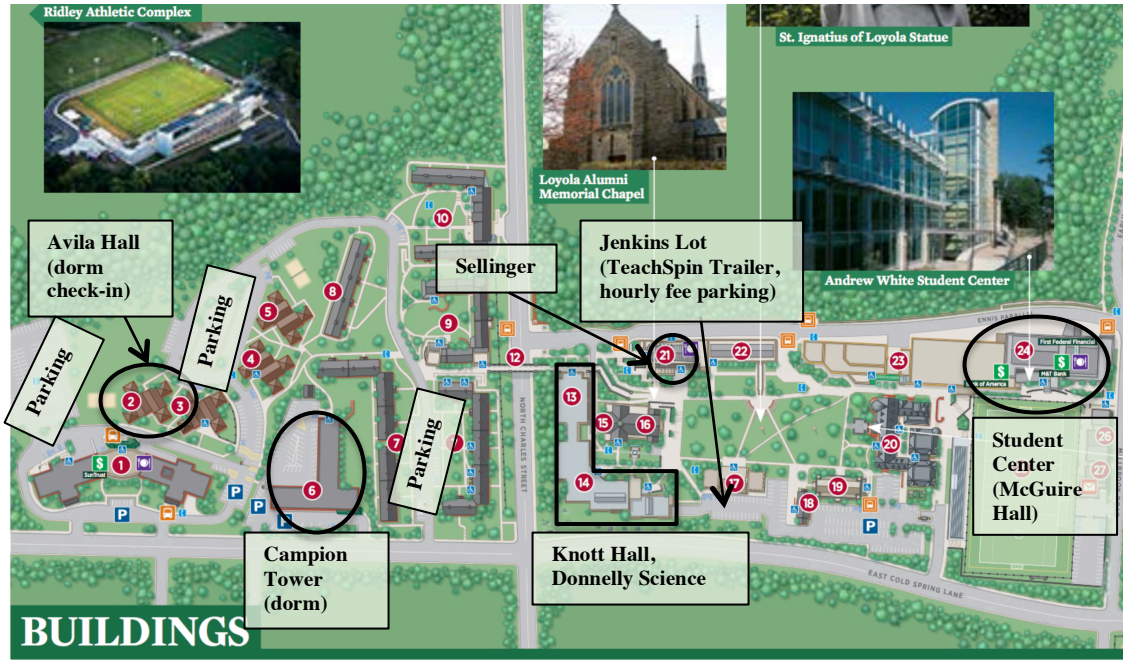
8-23-11 TDH





1. Newman Towers
2. Avila Hall
3. Bellarmine Hall
4. Claver Hall
5. Dorothy Day Hall
6. Campion Tower
7. Seton Court
8. Southwell Hall
9. Hopkins Court
10. Lange Court
11. Fitness & Aquatic Center
12. USF&G Pedestrian Bridge
13. Knott Hall
14. Donnelly Science Center
15. Cohn Hall
16. Alumni Memorial Chapel
17. Beatty Hall
18. Xavier Hall
19. Jenkins Hall
20. Rev. Francis X. Knott, S.J., Humanities Center
21. Sellinger School of Business & Management
22. Maryland Hall
23. DeChiaro College Center
24. Andrew White Student Center
25. Diane Geppi-Aikens Field
26. Bookstore
27. Stamp It! Student Mail Room
28. Armiger House
29. Rev. Brian F. Linnane, S.J., Alumni House
30. Ignatius House
31. Hammerman House
32. Maroger Art Studio
33. Butler Hall
34. Facilities Building
35. 300 Radnor Road
36. 302 Radnor Road
37. 304 Radnor Road
38. 305 Rossiter Aveue McEneany Cottage
39. 303 Rossiter Avenue