Ryan B. Balili

Research Associate
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Education

Ph.D. in Physics
University of Pittsburgh, USA, 2009
Specializing in Light-Matter Interaction in Semiconductors

Master of Science in Physics
University of Pittsburgh, USA, 2005

Bachelor of Science in Physics
Mindanao State University - Iligan Institute of Technology, Philippines, 2002
Graduated *Summa Cum Laude* and Class Valedictorian

Skills

Experimental Skills
Experienced and skilled in imaging and spectroscopy, low level electrical and optical signal measurement, semiconductor microcavity design, cryogenics, vacuum technology, femtosecond lasers, automation, electronics and photonic systems.

Problem Solving
Excellent analytical and logical reasoning. Learns new skills quickly. Ability to lead a team or work within a group environment or individually.

Computer Languages
Proficient in Igor. Experienced in Matlab, C, Mathematica, and Visual Basic.

Clean Room Skills
Years of work in a cleanroom environment. Experience includes wet-etching (acidic solutions including HF), reactive-ion etching, photolithography, laser writing, metal evaporation, e-beam evaporation, SEM characterization, wire bonding, critical drying.

Other
Excellent machine shop skills and know-how. Experienced in Computer Aided Design. Substantial teaching experience. Creative, motivated, and innovative.

Research Experience

Development of Novel Optoelectronic Devices *Fall 2012 to Present*
Currently exploring advanced optoelectronic devices based on microcavity polaritons for future applications as coherent light sources or optical transistors. Designed and fabricated air gap semiconductor microcavities.

Simulation of Semiconductor Microcavities and SPR Sensors *Fall 2010 to Fall 2012*
Simulated possible microcavity designs using amorphous silicon-, gallium nitride- and gallium arsenide-based microcavity structures for room temperature polariton emitters and other optoelectronic device applications. Also started work on surface plasmon resonance based fiber sensors for petroleum consistency.

Analysis of the Fine-Structure Splitting in Microcavities *Summer 2009 to Fall 2010*
Successfully explained the observed exciton-polariton fine-structure energy splitting in semiconductor microcavities.

BEC and Dynamics of Microcavity Polaritons *Fall 2004 to Spring 2009*
Established convincing evidence for high temperature Bose-Einstein condenstation (BEC) in trapped microcavity polaritons through a variety of optical measurements on stressed GaAs microcavity polaritons.

Bose-Einstein Condensation of Excitons in Double Quantum Wells *Summer 2004*
Performed optical and time-resolved experiments on double quantum well systems at cryogenic temperatures.

Cosmic Ray Flux Mapping *October 2000 to March 2002*
Characterized photomultiplier tubes and set-up experiments for cosmic ray flux measurements.

Employment, University of Cambridge, UK

Research Associate *Fall 2012 to Present*
Study focused on ultrafast dynamics of advanced emitters and semiconductor microcavities including polariton condensation. Explored new microcavity geometries and electrical control for optoelectronic properties. Current postdoc supervising students in the microcavity research group of the Nanophotonics Centre.

Employment, Mindanao State University - Iligan Institute of Technology

Associate Professor *August 2012 to August 2013*
After promotion, I obtained a research leave to do collaborative research at the University of Pittsburgh, USA. After which, I was offered a postdoctoral research position at the University of Cambridge, UK as a Marie Curie Experienced Researcher Fellow.

Assistant Professor *July 2009 to July 2012*
Led the Photonics Group of Iligan Institute of Technology. During this time, I have graduated six research advisees (three BS and three MS students). Graduate courses taught: Classical Electrodynamics, Quantum Mechanics, Statistical Mechanics, Solid State Physics and Electronics/Photonics Laboratory.

Instructor *Academic Year 2002 to July 2009*
Worked as a lecture and laboratory instructor for introductory physics courses.

Employment, University of Pittsburgh, USA

Graduate Research Assistant *Summer 2004 to Summer 2009*
Initially worked on the Bose-Einstein Condensation of Excitons in Double Quantum Wells during the summer of 2004; Presented compelling evidence for high temperature Bose-Einstein condensates in semiconductor microcavity systems.

Teaching Assistant *Fall 2003 to Spring 2004*
Responsibilities included teaching, tutoring, and grading undergraduate physics core-courses and introductory physics courses; laboratory instruction in introductory physics.

Administrative Positions Held

National Technical Assessor for Physics *August 2012*
Appointed member of the National Pool of Technical Assessors for Physics by the Commission on Higher Education for the evaluation of physics degree programs all over the Philippines.

President-Elect of SPVM *January 2010 to October 2012*
Vice-President *January 2010 to January 2012*
Samahang Pisika ng Visayas at Minanao (SPVM) is the premier physics society in the southern islands of the Philippines.

MSU-IIT Photonics Laboratory Coordinator *June 2010 to May 2012*
Position designated by the MSU-IIT to qualified faculty to facilitate and oversee operations in the laboratory. Laboratory improvement and research productivity are among the responsibilities associated with it.

Recent Publications

M. Steger, G. Liu, B. Nelsen, C. Gautham, D. Snoke, R. Balili, L. Pfeiffer, and K. West, "Long range ballistic motion and coherent flow of long lifetime polaritons" arXiv:1310.1798.

R. Balili, "Transfer matrix method in nanophotonics" Int. J. Mod. Phys. Conf. Ser. 17, 159-168 (2012).

R. Balili, B. Nelsen, D.W. Snoke, R.H. Reid, L. Pfeiffer, and K. West, "Huge splitting of polariton states in microcavities under stress" Physical Review B 81, 125311 (2010).

B. Nelsen, R. Balili, D.W. Snoke, L. Pfeiffer, and K. West,, "Lasing and polariton condensation: Two distinct transitions in GaAs microcavities with stress traps" Journal of Applied Physics 105, 122414 (2009).

R. Balili, B. Nelsen, D.W. Snoke, L. Pfeiffer, and K. West, "The role of the stress trap in polariton quasiequilibrium condensation in GaAs microcavities" Physical Review B 79, 075319 (2009).

R. Balili and D. Snoke, "Hotter Condensates" Physics World, Vol. 20, No. 9, (2007).

R. Balili, V. Hartwell, D. Snoke, L. Pfeiffer, and K. West, "Bose-Einstein Condensation of Microcavity Polaritons in a Trap" Science 316, 1007 (2007).

R. Balili, D. Snoke, L. Pfeiffer, and K. West, "Actively Tuned and Spatially Trapped Polaritons" Applied Physics Letters 88, 031110 (2006).

Z. Vörös, R. Balili, D.W. Snoke, L. Pfeiffer, and K. West, "Lateral Diffusion of Excitons in Double Quantum Well Structures" Physical Review Letters 94, 226401 (2005).

R. Balili "Free Wheel Racing" Philippine Physics Journal. ISSN 0117-150X, Vol. 25, 15-20, (2003).

Awards and Honors

Marie Curie INDEX ITN Experienced Researcher Fellow *October 2012*
Marie Curie funded my research position while based in Cambridge to study advanced emitters and semiconductor microcavities. The INDEX ITN network includes 7 academic and industrial groups from across the European Union as well as several associate partners from the US and EU. The position offered a range of research opportunities and collaboration with both academic and industrial partners. Through the network, I was able to experience working with FORTH in Crete, Nokia Research Center in Cambridge and Hitachi Laboratory in Cambridge.

ICO-ICTP Gallieno Denardo Awardee 2011 *February 2011*
The Gallieno Denardo Award is given by the International Commission for Optics (ICO) and the Abdus Salam International Center for Theoretical Physics (ICTP) to young researchers from developing countries who are active researchers in optics and who have made significant contributions to their field and to research activities in their own or in other developing countries.

Awardee of the Outstanding MSU-IIT Alumni (TOMA 2008) *July 2008*
TOMA Award is the highest honor bestowed by the Association of Iligan Institute of Technology Alumni Foundation, Incorporated (AIITAFI) and the Mindanao State University-Iligan Institute of Technology (MSU-IIT) Administration to MSU-IIT graduates who have made significant contribution to the society and the community.

Andrew Mellon Fellow *August 2007 - August 2008*
This is a predoctoral fellowship program of the Andrew W. Mellon Foundation that offers financial support for highly qualified students who have excelled in academics and research. The fellowship provides a two-term stipend and a scholarship for full tuition and fees for the period of the appointment.

Physica Status Solidi Young Researcher Award *June 2006*
Prize awarded for best research and presentation during the 7th International Conference on Excitonic Processes in Condensed Matter at Winston-Salem, USA last June 30, 2006.