ANGELA M. BARRAGAN

Room 3115 Beckman Institute for Advanced Science and Technology

University of Illinois at Urbana-Champaign ⋄ Urbana, IL 61801

(217) · 402 · 4080 ⋄ abarrag2@ks.uiuc.edu ⋄ http://www.ks.uiuc.edu/∼abarrag2/

EDUCATION

University Illinois at Urbana-Champaign, Urbana   *Fall 2012 - Present*
Ph.D. in Physics, Main Advisor: Klaus Schulten (deceased)
Current Advisor: Zaida Luthey-Schulten, Co-advisor: Ilia Solov'yov
Ph.D. thesis "Theoretical description of the Cytochrome bc_1 Complex reaction mechanism"

Autonomous National University of Mexico, Mexico City, MEX   *Jun 2013*
M.Sc. in Physics, Advisor: Alfred U'Ren
Master thesis "Quantum states of pair photons with spatial and spectral entanglement"

University of Antioquia, Medellin, COL   *Dec 2009*
B.Sc. in Physics, Advisor: Herbert Vinck-Posada
Undergraduate thesis "Defective modes in two-dimensional photonic crystals"

TEACHING AND RESEARCH EXPERIENCE

University of Illinois at Urbana-Champaign   Fall 2012 - present
· Lecturer of the upper-level course Electromagnetic Fields II, Department of Physics (January 2019 - May 2019)
· Scholar-Communicator, Center for the Physics of Living Cells (CPLC) (August 2018 - July 2019)
· Outreach Teaching Fellow, Center for the Physics of Living Cells (CPLC) (January 2014 - June 2017)
· Research Assistant, Theoretical and Computational Biophysics Group (TCBG) (Spring 2013 - present)
· Teaching Assistant, Department of Physics (Fall 2012, Fall 2018)

University of Southern Denmark   2015 - 2018
· Guest Researcher, Department of Physics, Chemistry and Pharmacy (July 2017 - June 2018)
· Teaching Assistant for "Hands-on" Workshop on Computational Biophysics (October 2015)

University of Antioquia   2006 -2010
· University Physics Lecturer, Department of Physics (November 2009 - July 2010).
· Teaching Assistant, Project U outreach program (Spring 2007 - Fall 2008).
· Administrative Assistant for the Research group Phenomenology of Fundamental Interactions and Particle Physics (Spring 2007 - Summer 2010).
· Teaching Assistant, Quality Schools Project (Winter 2006).
· Teaching Assistant, Department of Mathematics (Spring - Fall 2006).

PUBLICATIONS

· **A. M. Barragan**, A. Soudackov, Z. Luthey-Schulten, K. Schulten, S. Hammes-Schiffer, I. A. Solov'yov. *Revealing the identity of the rate-limiting step in the Cytochrome bc_1 Complex.* In writing.
· **A. M. Barragan**, K. Schulten, I. A. Solov'yov. *Mechanism of the Primary Charge Transfer Reaction in the Cytochrome bc_1 Complex.* Journal of Physical Chemistry B **120** (44), 11369-11380 (2016). (COVER).

- A. Singharoy, **A. M. Barragan**, S. Thangapandian, E. Tajkhorshid, K. Schulten. *Binding Site Recognition and Docking Dynamics of a Single Electron Transport Protein: Cytochrome c_2.* Journal of American Chemical Association **138** (37), 12077-12089 (2016).
- J. Stone, M. Sener, K. L. Vandivort, **A. M. Barragan**, A. Singharoy, I. Teo, B. Isralewitz, B. Liu, B. C. Goh, J. C. Phillips, C. MacGregor-Chatwin, M. Johnson, L. F. Kourkoutis, C. N. Hunter, K. Schulten. *Atomic Detail Visualization of Photosynthetic Membranes with GPU-Accelerated Ray Tracing.* Parallel Computing **55**, 17-27 (2016).
- **A. M. Barragan**, A. R. Crofts, K. Schulten, I. Solov'yov. *Identification of Ubiquinol Binding Motifs at the Q_o-site of the Cytochrome bc_1 Complex.* Journal of Physical Chemistry B **119**, 433-447 (2015) (COVER)
- M. Sener, J. E. Stone, **A. M. Barragan**, A. Singharoy, I. Teo, K. L. Vandivort, B. Isralewitz, B. Liu, B. Chong Goh, J. C. Phillips, L. F. Kourkoutis, C. N. Hunter, K. Schulten. *Visualization of Energy Conversion Processes in a Light Harvesting Organelle at Atomic Detail.* Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis, SC '14. IEEE Press (2014).
- D. Cruz-Delgado, J. Monroy-Ruz, **A. M. Barragan**, E. Ortiz-Ricardo, H. Cruz-Ramirez, R. Ramirez-Alarcon, K. Garay-Palmett, A. B. U'Ren. *Configurable spatiotemporal properties in a photon-pair source based on spontaneous four-wave mixing with multiple transverse modes.* Optics letters **39** 12, 3583-3586 (2014).

SCHOLARSHIPS AND FELLOWSHIPS

- Beckman Institute Graduate Fellowship (2015 - 2016).
- P.E.O. International Peace Scholarship (2015-2016).
- Photosynthetic Antenna Research Center (PARC) Education & Outreach Mini-Grant (2015 - 2016).
- P.E.O. International Peace Scholarship (2014 - 2015).
- National Scholarship CONACYT, National Council of Science and Technology, Mexico (August 2010 - July 2012).

AWARDS AND RECOGNITIONS

- Renato Bobone Award, Department of Physics, University of Illinois at Urbana-Champaign (April 2019).
- Teacher Ranked as Excellent by Their Students*****. University of Illinois at Urbana-Champaign (January 2019). ***Outstanding rank**.
- First Place at the Biophysical Society The Art of Science Image Contest (March 2019).
- Scott Anderson Outstanding Graduate Assistant Award, Department of Physics, University of Illinois at Urbana-Champaign (April 2015).
- Winner of the SC'14 Scientific Visualization and Data Analytics Showcase: "Visualization of Energy Conversion Processes in a Light Harvesting Organelle at Atomic Detail" (November 2014).

ACADEMIC VISITS

- University of Southern Denmark. Odense, DEN. Professor Ilia Solv'yov. **July 2017 - June 2018**; June - July 2016; October 2015; June 2015; June 2015.

PRESENTATIONS

Oral

- Revealing the key steps of the cytochrome bc_1 complex, HPC Seminar, University of Southern Denmark, Odense, DEN (June 2018).
- Molecular description of the bc_1 complex energy transfer mechanism. Beckman Institute Graduate Student Seminar, Urbana, USA (March 2016).
- Molecular aspects of the Q-cycle: Quinol binding and proton-coupled electron transfer. CPLC/CBQB Graduate Student/Postdoc Symposium, Urbana, USA (May 2015).
- Spatial and spectral entangled states through SFWM, V Annual Meeting of the Quantum Information Division, Tonantzintla, MEX (April 2012)
- Quantum phase transition of light as a control of the entanglement between interacting quantum dots, APS March Meeting 2011, Dallas, USA. (March 2011).
- Quantum phase transition of light with coupled quantum dots, First National Conference on Quantum Information and Quantum Computation, National University of Colombia, Bogota, COL. (February 2010).
- Quantum phase transition of light in optical cavities with coupled quantum dots, National Physics Conference (October 2009).
- Optical modes coupling in two cavities embedded in a two-dimensional photonic crystal, National Physics Conference (October 2009).
- Point defects as photonic crystal filters, National Physics Conference (October, 2009).
- Mössbauer study of FeAlCo mechanical alloys, National Physics Conference (October 2007).
- Development of an graphic interface to simulate and to control experimentally a disc pendulum, National Physics Conference (October 2007).

Poster

- Physical description of the cytochrome bc_1 complex reaction mechanism. iPoLS Annual Meeting, Paris, FRA (June 2017).
- Biofísica En Español: Developing Spanish Language Biophysics Lessons For The Precollege Classroom. Biophysical Society Meeting, Los Angeles, USA (February 2016).
- Molecular aspects of the bc_1 complex Q-cycle: Quinol binding and proton- coupled electron transfer. FEBS 2015, Berlin, GER (July 2015).
- New perspectives on quinol binding motifs at the bc_1 complex based on MD simulations, Biophysical Society Meeting, Baltimore, USA (February 2015).
- Optical lattices induced by photonic crystals, National Physics Conference, COL (February 2010).
- Study of defective modes in cavities of two-dimensional L1, L2 and L3-type photonic crystals, National Physics Conference, COL (October 2009).
- Mechanical transformation of the Ilmenite by high-frequency milling, National Physics Conference, COL (October 2007).
- Structural and magnetic transformation of Fe60Al40 in a planetary ball mill, National Physics Conference, COL (October 2007).
- Enrichment iron materials by treatment with NaOH and mechanical alloy, National Physics Conference, COL (October 2007).

Other attended events

- weSTEM Conference, Urbana, USA (February 2019).
- POGIL (Process Oriented Guided Inquiry Learning) seminar, Urbana, USA (December 2018).
- Alan Alda Center for Communicating Science Workshop, Urbana, USA (September 2018).
- CPLC/Biophysics Graduate Student/Postdoc Symposium, Urbana, USA (December 2015, November 2014, May 2014).
- Les Houches Summer School on Integrated Structural Cell Biology, Les Houches, FRA (July 2014).
- 9th Annual Biophysics PhD Meeting, Holbæk, DEN (June 2014).

· Workshop on Quantum Information, CINVESTAV, Mexico City, MEX (April 2011).
· Meeting RIO-MEX on Optics and Quantum Information, Institute of Physics, UNAM, Mexico City, MEX (November 2010).
· Summer School on Cold Atoms and Optical Lattices at Clarendon Laboratory University of Oxford, Oxford, UK (September 2008).
· IV National Congress on Physics Teaching, Medellin, COL (October 2008).
· Course on Polarization, University of Antioquia, Medellin, COL (February 2008).

SERVICE

Lead Organizer
· Physics of Living Systems Education Meeting, Johns Hopkins University, Baltimore (February 2019).
· CPLC/CBQB Graduate Student/Postdoc Symposium, Beckman Institute, Urbana (November 2018).

Organizations and committees
· Graduate Diversity Committee member, Department of Physics, University of Illinois at Urbana-Champaign (2016 - 2018).
· President of the Colombian Student Association at the University of Illinois at Urbana-Champaign (2017 - 2018).
· American Physical Society member. Student (2012).
· Biophysical Society member. Student (2015, 2019).

Outreach presentations
· Beckman Institute Open House (2019, 2015, 2013)
· SACNAS Cena y Ciencias (2019, 2013)
· IGB Genome Day (2016, 2015, 2014, 2013)
· Science fair, Leal Elementary School (2013)

TECHNICAL STRENGTHS

Languages	Spanish (Native), English (Advanced), French (Basic)
Computer Languages	Mathematica, Matlab, C, Tcl
Tools	NAMD, VMD, Gaussian, Q-Chem, Latex, Photoshop, Final Cut Pro