

Adriana Sweet (née Ureche)

adau@berkeley.edu

EDUCATION

University of California at Berkeley, Berkeley, CA, USA
Ph.D. Candidate, Nuclear Engineering
GPA= 3.8/4.0

Degree Expected: **Summer 2020**

University of California at Berkeley, Berkeley, CA, USA
Masters of Science, Nuclear Engineering
GPA= 3.7/4.0

Degree Awarded: **December 2017**

University of California at Berkeley, Berkeley, CA, USA
Bachelor of Science, Nuclear Engineering
GPA= 3.4/ 4.0

Degree Awarded: **May 2015**

RESEARCH EXPERIENCE

Graduate Student Research Assistant in Nuclear Physics

Fall 2015 – Present

Laboratory Mentor: Dr. Darren L. Bleuel || Lawrence Livermore National Laboratory (LLNL), Livermore, CA

- Developing the toolkit of methods and techniques needed for a measurement of the neutron-capture cross section of the more neutron-rich isotopes when the Facility for Rare Isotope Beams (FRIB) comes online
- Performed Monte Carlo simulations of statistical γ decay of a neutron-rich nucleus to determine the systematic errors of the β -Oslo method
- Advanced development of a GEANT4 simulation for a total absorption spectrometer and plastic scintillator barrel detector experimental set-up
- Calculated neutron capture rates using the β -Oslo Method and the reaction code TALYS

Graduate Student Instructor

Spring 2016, Spring 2017

Professor Jasmina Vujic || Department of Nuclear Engineering, UC Berkeley

- Assisted in the teaching of the course: *Introduction to Nuclear Reactor Theory*
- Taught focused discussion groups (~25 students) and held weekly office hours to encourage discussions of course topics as well as relevant research topics which students expressed interest in pursuing
- Created and graded problem sets, midterm exams, final exam and homework assignments

Undergraduate Research Assistant in Nuclear Physics

Fall 2013 – Spring 2015

Laboratory Mentor: Dr. Aaron M. Hurst || Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA

- Performed statistical-model calculations using the Monte Carlo code DICEBOX to test different permutations of nuclear level density and photons strength function model combinations to assess the quality of the experimental data
- Analysis of prompt thermal-capture gamma-ray spectra using spectroscopy software package HYPERMET-PC: general peak-fitting analysis and energy calibrations

SCHOLASTIC HONORS & AWARDS

- **Nuclear Science and Security Consortium Graduate Fellowship (2015-2020)**
- **INTPART Grant University of Oslo (Prof. Sunniva Siem) & UC Berkeley (Prof. Jasmina Vujic) exchange (Spring 2019)**
- Certificate of Completion, *Public Policy and Nuclear Threats Bootcamp*—UC Institute on Global Conflict and Cooperation (2016)
- **American Physical Society's Conference Experience for Undergraduates Award (Fall 2014)**
- **Institute of International Studies (IIS) Undergraduate Conference Travel Grant (Fall 2014)**
- Dean's List of Honors—UC Berkeley College of Engineering (Spring 2014)
- Certificate of Completion, *International Safeguards Policy and Information*—Monterey Institute of International Studies (2014)
- **Undergraduate Research Assistant Program (URAP) Summer Employment Award (2014)**

THESIS PROJECTS

Constrained Nuclear Level Density and γ -Decay Strength for the $^{92}\text{Sr}(n, \gamma)$ Reaction

Ph.D. Dissertation at UC Berkeley, Department of Nuclear Engineering

01/2018 – Present

- First experimentally-informed determination of the $^{92}\text{Sr}(n, \gamma)$ cross from statistical nuclear properties
- Component of LLNL's Lab Directed Research and Development (LDRD) supported project to improve cross sections for neutron-induced reactions to support the U.S. stockpile stewardship mission

Master of Science Thesis at UC Berkeley, Department of Nuclear Engineering

08/2015 – 12/2017

- Thesis title: “Spin within the β -Oslo Method”
- Investigation into the sensitivity to of the β -Oslo Method in the case of β -decay populated nucleus by using a hypothetical Monte Carlo generated neutron-rich nucleus. The spin selectivity of β decay introduces uncertainties when extracting an apparent nuclear level density compared to true nuclear level density.

Bachelor of Science Thesis at UC Berkeley, Department of Nuclear Engineering

08/2013 – 06/2015

- Investigation into establishing a new independent measurement of the total thermal neutron-capture cross section for the $^{139}\text{La}(n,\gamma)$ reaction and comparison with the adopted literature to improve nuclear data and reaction libraries
- Techniques, such as neutron activation analysis (NAA), implemented have applications in nonproliferation effort

PRESENTATIONS, PEER-REVIEWED PUBLICATIONS & PROPOSALS

Nuclear Level Density and γ -Decay Strength for ^{93}Sr

Invited presentation at the 7th Workshop on Nuclear Level Density & Gamma Strength

May 2019 | Oslo, Norway

Experimentally constrained $^{92}\text{Sr}(n,\gamma)$ reaction rate

Oral presented at the 5th Joint Meeting of the Division of Nuclear Physics of the American Physical Society & the Physical Society of Japan

October 2019 | Waikoloa, HI

Statistical Properties of Nuclei Far from Stability for National Security Applications

Invited presentation at the 6th Workshop on Nuclear Level Density & Gamma Strength

May 2017 | Oslo, Norway

Experimentally constrained $^{92}\text{Sr}(n,\gamma)$ reaction rates relevant to r-process nucleosynthesis

Poster presented at the 3rd International Conference on Advances in Radioactive Isotopes Science (ARIS 2017)

May 2017 | Keystone, CO

A. Sweet (PI), D. L. Bleuel (co-PI), N. Scielzo, L. A. Bernstein, B. L. Goldblum, J. Vujic, J. Clark, G. Savard, D. Santiago-Gonzalez, A. Spyrou, S. Liddick, K. Childers, C. Harris, R. Lewis, S. Lyons, A. Palmisano, A. Richard, D. Richard, M. K. Smith, A. C. Dombos, F. Naqvi, A. C. Larsen, M. Guttormsen, A. G3rgen, F. L. B. Garrote, T. Renstr3m, S. Siem, “ $^{93,94,95}\text{Sr}(n, \gamma)$ cross sections constrained with the β -Oslo Method”, Argonne National Laboratory Beam Time Proposal, **Accepted Priority I ranking**, March 2019. Scheduled June 2020.

T.A. Laplace, B. L. Goldblum, J. A. Brown, D. L. Bleuel, C. A. Brand, G. Gabella, T. Jordan, C. Moore, N. Munshi, Z. W. Sweger, **A. Sweet**, E. Brubaker, “Low energy light yield of fast plastic scintillators”, NIM A **954** (2020) 161444.

A. M. Hurst, **A. Sweet**, B. L. Goldblum, R. B. Firestone, M. S. Basunia, L. A. Bernstein, Zs. R3vay, L. Szentmiklosi, T. Belgya, J. E. Escher, I. Hars3nyi, M. Krit3cka, B. W. Sleaford, and J. Vujic, “Radiative-capture cross sections for $^{139}\text{La}(n,\gamma)$ reaction using thermal neutrons and structural properties of ^{140}La ”, Phys. Rev. C **99**, 024310 (2019)

A. M. Hurst, R. B. Firestone, B. W. Sleaford, D. L. Bleuel, M. S. Basunia, F. Be3v3l, T. Belgya, L. A. Bernstein, J. J. Carroll, B. Detwiler, J. E. Escher, C. Genreith, B. L. Goldblum, M. Krit3cka, A. G. Lerch, D. A. Matters, J. W. McClory, S. R. McHale, Zs. R3vay, L. Szentmiklosi, D. Turkoglu, **A. Ureche**, and J. Vujic, “Developments in capture- γ libraries for nonproliferation applications”, The European Physical Journal Conferences, **146**, 09008 (2017).

RELEVANT SKILLS

SOFTWARE

- β -Oslo Method
- Monte Carlo code: DICEBOX & RAINIER
- UNIX & Linux environments
- TALYS
- GEANT4
- ROOT programming
- MATLAB
- Unix (Bash) shell scripting
- Python, C++
- LaTeX typesetting & scientific writing
- Monte Carlo N-Particle: MCNP5 (working knowledge)

LABORATORY SKILLS

- Neutron Activation Analysis (NAA) & Prompt Gamma Activation Analysis (PGAA)
- Gamma Ray Spectroscopy: HYPERMET-PC & RadWare
- Radiation detection and instrumentation
- Nuclear data analysis