

CURRICULUM VITAE

Oksana Chubenko

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Accelerator physicist with theoretical and experimental background in the field of advanced electron sources for accelerator applications

RESEARCH EXPERIENCE

- August 2022 - present **Department of Physics, Northern Illinois University, De Kalb, IL, USA**
Assistant Professor
Research and development of bright and highly spin-polarized electron sources.
- January 2019 – August 2022 **Department of Physics, Arizona State University, Tempe, AZ, USA**
Postdoctoral Research Scholar
Project lead in Monte Carlo modeling of laser-induced heating effects in semiconductor photocathodes and their effect on the electron beam brightness. Designed an UHV growth chamber for *in situ* measurements of optical and electrical properties of alkali antimonide films. Hands-on experience in epitaxial growth and advanced characterization (photoemission, photoluminescence, photo-conductivity, AFM/KPFM) of alkali antimonide photocathodes. Experience in X-ray characterization of photocathodes at Brookhaven National Lab. Co-advised two PhD students, organized group meetings and seminars.
- September 2012 – January 2019 **Department of Physics, The George Washington University, Washington, DC, USA**
Graduate Research Assistant
Modeling and simulation of physical processes in advanced electron sources for accelerator applications. Developed Monte Carlo code to calculate both spin-polarization and quantum efficiency from GaAs photocathodes as a function of different material and laser parameters. Obtained estimates of quantized energy levels at the surface of heavily-doped GaAs. Developed theoretical model to explain current-density-saturation effect in (N)UNCD field emitters.
- January – June 2018 **Accelerated Development & Support Corporation, Arlington, VA, USA**
Researcher III: support services for the Naval Research Lab
Performed numerical analyses of photo-absorption data from bi-alkali antimonide photocathodes. Helped to implement the surface roughness model to simulate electron trajectories in the applied electric field.
- January 2016 – August 2017;
June – August 2015 **Euclid Techlabs LLC, Gaithersburg, MD, USA**
Research Associate
Lab experience in designing, testing, and prototyping (N)UNCD field emitters. Developed the LabView code for automated measurements of I-V characteristics from field emission electron sources. Developed the code to process large sets of micrographs representing electron field emission sites formed on the surface of nanodiamond films. Duties involved work with magnetron sputtering system, spectrophotometer, scanning electron microscope.
- June – August 2014;
July – August 2013 **Thomas Jefferson National Accelerator Facility, Newport News, VA, USA**
Intern

Assisted with assembling the photocathode test chamber and optics setup. Performed activation of spin-polarized electron sources (bulk GaAs and GaAs-based superlattice structures) to negative electron affinity level. Tested photoemissive characteristics of these photocathodes. Duties involved work with UHV equipment, monochromator, and high-power laser.

June –
December 2011;
January – May 2010 **Institute of High Energy Physics and Nuclear Physics, National Science Centre “Kharkiv Institute of Physics and Technology”, Kharkiv, Ukraine**
Intern
Performed analysis of novel experimental data for Z^0 boson creation from the CMS detector at LHC.

TEACHING EXPERIENCE

January 2020 **Winter session of the US Particle Accelerator School, San Diego, CA, USA**
Graduate Teaching Assistant (graduate courses “Photocathode Physics” and “High Brightness Electron Injectors and Applications”)
Assisted with homework set preparations, participated in discussion sessions, graded homework sets for 25 grad students and postdocs.

September –
December 2014 **Department of Physics, The George Washington University, Washington, DC, USA**
Graduate Teaching Assistant (graduate “Statistical Mechanics” course)
Graded weekly homework sets for approximately 10 grad students and provided detailed problem solutions.

January – May 2013 **Department of Physics, The George Washington University, Washington, DC, USA**
Graduate Teaching Assistant (undergraduate “General Physics” course)
Assisted a professor with lectures and lab demonstrations in an 80-students class. Graded weekly quizzes and presented constructive feedback. Held office hours.

EDUCATION

September 2012 –
January 2019 **The George Washington University, Washington, DC, USA**
PhD in Physics, MPhil in Physics

September 2015 –
May 2016 **The George Washington University, Washington, DC, USA**
Graduate Certificate in High Performance Computing

September 2010 –
May 2012 **V. N. Karazin Kharkiv National University, Kharkiv, Ukraine**
MS in Experimental Nuclear Physics

September 2006 –
May 2010 **V. N. Karazin Kharkiv National University, Kharkiv, Ukraine**
BS in Applied Physics

SKILLS

- Advanced skills in Mathematica, Matlab, LabView, Autodesk: Inventor.
- Proficient in C, C++, Fortran, UPC, MPI, ROOT, GitLab, cluster computing.
- Comfortable handling most physics laboratory equipment, including turbo/ion/sublimation/NEG pumps, RGA, high power laser, monochromator, SEM, AFM, KPFM, Keithley SourceMeter, spectrometer, etc.
- Advanced MacOS/Windows/Linux user.
- Experience with writing research reports and journal articles, academic advising, project leadership.

SELECTED PUBLICATIONS

P. Saha, **O. Chubenko**, G. S. Gevorkyan, A. Kachwala, C. J. Knill, C. Sarabia-Cardenas, E. Montgomery, S. Poddar, J. T. Paul, R. G. Hennig, H. A. Padmore, and S. Karkare, *Physically and chemically smooth cesium-antimonide photocathodes on single crystal strontium titanate substrates*, [Appl. Phys. Lett. **120**, 194102 \(2022\)](#).

T. Y. Posos, **O. Chubenko**, and S. V. Baryshev, *Confirmation of Transit-Time Limited Field Emission in Advanced Carbon Materials with Fast Pattern Recognition Algorithm*, [ACS Appl. Electron. Mater. **3**, 4990 \(2021\)](#).

O. Chubenko, S. Karkare, D. A. Dimitrov, J. K. Bae, L. Cultrera, I. Bazarov, and A. Afanasev, *Monte Carlo Modeling of Spin-Polarized Photoemission from p-doped Bulk GaAs*, [J. Appl. Phys. **130**, 063101 \(2021\)](#).

K. L. Jensen, M. McDonald, **O. Chubenko**, J. R. Harris, D. Shiffler, N. A. Moody, J. J. Petillo, and A. J. Jensen, *Thermal-Field and Photoemission from Meso- and Micro-scale Features: Effects of Screening and Roughness on Characterization and Simulation*, [J. Appl. Phys. **125**, 234303 \(2019\)](#).

O. Chubenko, S. S. Baturin, and S. V. Baryshev, *Theoretical Evaluation of Electronic Density-of-states and Transport Effects on Field Emission from n-type Ultrananocrystalline Diamond Films*, [J. Appl. Phys. **125**, 205303 \(2019\)](#).

J. Qiu, S. S. Baturin, K. K. Kovi, **O. Chubenko**, G. Chen, R. Konecny, S. Antipov, A. V. Sumant, C. Jing, S. V. Baryshev, *Nanodiamond Thin Film Field Emitter Cartridge for Miniature High-Gradient Radio Frequency X-Band Electron Injector*, [IEEE Transactions on Electron Devices **65**, 1132 \(2018\)](#).

O. Chubenko, S. S. Baturin, K. K. Kovi, A. V. Sumant, and S. V. Baryshev, *Locally Resolved Electron Emission Area and Unified View of Field Emission from Ultrananocrystalline Diamond Films*, [ACS Appl. Mater. Interfaces **9**\(38\), 33229 \(2017\)](#).

O. Chubenko, S. S. Baturin, and S. V. Baryshev, *Scanning Probe Microscopy and Field Emission Schemes for Studying Electron Emission from Polycrystalline Diamond*, [Appl. Phys. Lett. **109**, 113102 \(2016\)](#).