

Eli D. Kinigstein

CHESS RESEARCH ASSOCIATE

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I focus on time-resolved synchrotron X-ray experiments and the remarkable insights they offer. For example, I am currently studying electrically driven phase transitions using time resolved x-ray scattering, and reaction dynamics of electro-catalysts using time resolved x-ray spectroscopy. I also design and build time-resolved X-ray detectors for synchrotron science.

Education

Columbia University

PH.D. IN PHYSICS

New York, NY

2011 – 2018

Columbia University

M.A. IN PHYSICS

New York, NY

2011 – 2013

University of Vermont

B.S. IN PHYSICS, MINOR IN MATHEMATICS, CUM LAUDE

Burlington, VT

2007 – 2011

Experience

Cornell Laboratory for Accelerator-Based Sciences and Education (CLASSE)

CHESS SCIENTIST (RESEARCH ASSOCIATE)

- Building a digital twins of CHESS beamlines.
- Developed time-resolved X-ray polarization monitor.
- Developed home built large area avalanche photodiode.
- Developed a time-resolved scattering at beamline 4b.

Ithaca, NY

01/2024 - Present

RIXS Group, Advanced Light Source, Lawrence Berkeley National Lab

POSTDOCTORAL APPOINTEE FOR DR. JINGHUA GUO

- Integrate time-resolved electrochemical techniques with time-resolved X-ray spectroscopy instrumentation.
- Studied scaling on gas diffusion electrodes for electrochemical H₂O₂ generation.

Berkeley, CA

12/2021 - 12/2023

Time Resolved Research Group, Advanced Photon Source, Argonne National Lab

POSTDOCTORAL APPOINTEE FOR DR. XIAOYI ZHANG

- Research and development of time-resolved laser pump X-ray spectroscopy instrumentation, with particular emphasis on data acquisition methods and X-ray detector development.

Chicago, IL

03/2019 - 11/2021

Center for Functional Nano Materials, Brookhaven National Lab and Columbia University

GRADUATE RESEARCH ASSISTANT TO DR. MATTHEW SFEIR

- Thesis: Structural and Optical Characterization of Solution Processed Lead Iodide Ruddlesden-Popper Perovskite Thin Films.
- Research experience in characterizing nanoscale electronic processes using time-resolved optical techniques (transient absorption, photoluminescence).
- Research experience in ultrafast optics instrumentation.
- Research experience in structural analysis of films using grazing incidence X-ray scattering data at the National Synchrotron Light Source-II.

New York, NY

1/2017 - 10/2018

Publications

- [1] Cunming Liu, **Eli Kinigstein**, and Xiaoyi Zhang. “Time-Resolved X-ray Absorption Spectroscopy and Diffraction toward Solar Energy Conversion”. In: *Photon Science* (2026).
- [2] Elliot Fuller, Alan Zhang, Timothy Brown, Sangheon Oh, Catalin Spataru, Joshua Sugar, **Eli Kinigstein**, Jinghua Guo, Arantzazu Mascaraque, Enrique Michel, et al. “Engineering the Spin Transition and Carrier Type with High-Entropy Lattice Distortions in Rare Earth Cobaltates”. In: *APS March Meeting Abstracts*. Vol. 2024. 2024, J00–159.
- [3] Alan Zhang, Sangheon Oh, Byoung Ki Choi, Eli Rotenberg, Timothy D Brown, Catalin D Spataru, **Eli Kinigstein**, Jinghua Guo, Joshua D Sugar, Elena Salagre, et al. “Tuning the Spin Transition and Carrier Type in Rare-Earth Cobaltates via Compositional Complexity”. In: *Advanced Materials* 36.47 (2024), p. 2406885.
- [4] **Eli Kinigstein**, Christopher Otolski, Guy Jennings, Gilles Doumy, Donald A Walko, Xiaobing Zuo, Jinghua Guo, Anne Marie March, and Xiaoyi Zhang. “Asynchronous X-ray Multi-Probe Data Acquisition for X-ray Transient Absorption Spectroscopy”. In: *Review of Scientific Instruments* 94.1 (2023), p. 014714.
- [5] Hsinhan Tsai, Dibyajyoti Ghosh, **Eli Kinigstein**, Bogdan Dryzhakov, Honora Driscoll, Magdalena Owczarek, Bin Hu, Xiaoyi Zhang, Sergei Tretiak, and Wanyi Nie. “Light-Induced Structural Dynamics and Charge Transport in Layered Halide Perovskite Thin Films”. In: *Nano Letters* (2023).

- [6] Davis Unruh, Chaitanya Kolluru, **Eli Kinigstein**, Xiaoyi Zhang, and Maria Chan. “Fully Automated Nano-scale to Atomistic Structure from Theory and X-Ray Spectroscopy Experiments”. In: *Bulletin of the American Physical Society* (2022).
- [7] Alexandra Brumberg, Matthew S Kirschner, Benjamin T Diroll, Kali R Williams, Nathan C Flanders, Samantha M Harvey, Ariel A Leonard, Nicolas E Watkins, Cunming Liu, **Eli Kinigstein**, et al. “Anisotropic Transient Disorder of Colloidal, Two-Dimensional CdSe Nanoplatelets upon Optical Excitation”. In: *Nano letters* 21.3 (2021), pp. 1288–1294.
- [8] Benjamin T Diroll, Alexandra Brumberg, Ariel A Leonard, Shobhana Panuganti, Nicolas E Watkins, Shelby A Cuthriell, Samantha M Harvey, **Eli Kinigstein**, Jin Yu, Xiaoyi Zhang, et al. “Photothermal behaviour of titanium nitride nanoparticles evaluated by transient X-ray diffraction”. In: *Nanoscale* 13.4 (2021), pp. 2658–2664.
- [9] **Eli Kinigstein**, Guy Jennings, Charles A Kurtz, Anne Marie March, Xiaobing Zuo, Lin X Chen, Klaus Attenkofer, and Xiaoyi Zhang. “X-ray Multi-Probe Data Acquisition: A Novel Technique for Laser Pump X-ray Transient Absorption Spectroscopy”. In: *Review of Scientific Instruments* 92.8 (2021), p. 085109.
- [10] Sarah Ostresh, James Nyakuchena, Brian Pattenale, Jens Neu, Daniel Streater, Christian Fiankor, Wenhui Hu, **Eli Kinigstein**, Jian Zhang, Xiaoyi Zhang, et al. “Photoinduced Charge Transport in Conductive Metal Organic Frameworks”. In: *2021 46th International Conference on Infrared, Millimeter and Terahertz Waves (IRMMW-THz)*. IEEE. 2021, pp. 1–2.
- [11] **Eli Kinigstein**, Hsinhan Tsai, Wanyi Nie, Jean-Christophe Blancon, Kevin G Yager, Kannatassen Appavoo, Jacky Even, Mercouri G Kanatzidis, Aditya D Mohite, and Matthew Y Sfeir. “Edge States Drive Exciton Dissociation in Ruddlesden–Popper Lead Halide Perovskite Thin Films”. In: *ACS Materials Letters* 2.10 (2020), pp. 1360–1367.
- [12] James Nyakuchena, Sarah Ostresh, Daniel Streater, Brian Pattengale, Jens Neu, Christian Fiankor, Wenhui Hu, **Eli Kinigstein**, Jian Zhang, Xiaoyi Zhang, et al. “Direct evidence of photoinduced charge transport mechanism in 2D conductive metal organic frameworks”. In: *Journal of the American Chemical Society* 142.50 (2020), pp. 21050–21058.
- [13] Hsinhan Tsai, Cunming Liu, **Eli Kinigstein**, Mingxing Li, Sergei Tretiak, Mircea Cotlet, Xuedan Ma, Xiaoyi Zhang, and Wanyi Nie. “Critical Role of Organic Spacers for Bright 2D Layered Perovskites Light-Emitting Diodes”. In: *Advanced science* 7.7 (2020), p. 1903202.
- [14] Sizhuo Yang, Wenhui Hu, James Nyakuchena, Christian Fiankor, Cunming Liu, **Eli Kinigstein**, Jian Zhang, Xiaoyi Zhang, and Jier Huang. “Unravelling a long-lived ligand-to-metal cluster charge transfer state in Ce–TCPP metal organic frameworks”. In: *Chemical Communications* 56.90 (2020), pp. 13971–13974.
- [15] **Eli Kinigstein**. *Structural and Optical Characterization of Solution Processed Lead Iodide Ruddlesden–Popper Perovskite Thin Films*. Columbia University, 2018.
- [16] **Eli Kinigstein**, Wanyi Nie, Hsinhan Tsai, Matthew Sfeir, and Aditya Mohite. “Exciton Dissociation at Grain Boundaries in Lead Halide Ruddlesden Popper Perovskite Thin Films”. In: *APS March Meeting Abstracts*. Vol. 2018. 2018, pp. C11–004.

Presentation

International Workshop on Photoionization Resonant Inelastic X-ray Scattering (IWP&RIXS) 2026, Lawrence Berkeley National Laboratory

Berkeley, CA

INVITED TALK

July 2026

- Eli Kinigstein, “Synchronized In-Situ X-ray Scattering”.

Brookhaven National Laboratory

Upton, NY

INVITED TALK

TBD 2026

- Eli Kinigstein, “Synchronized In-Situ X-ray Scattering”.

CHESS Seminar, Cornell University

Ithaca, NY

INVITED TALK

April 2023

- Eli Kinigstein, “X-ray Transient Absorption Spectroscopy for Understanding Photochemical Reaction Dynamics”.

Optical Control Of Physical Processes Probed With X-Rays Conference at CHESS, Cornell University

Ithaca, NY

INVITED TALK

June 2022

- Eli Kinigstein, “X-Ray Transient Absorption Spectroscopy For Precision Measurements of Photochemical Dynamics”.

Advanced Photon Source User Meeting

Lemont, IL

INVITED TALK

May 2022

- Eli Kinigstein, “Progress in XTA spectroscopy instrumentation at the APS”.

XAFS Conference 2021

PRESENTATION (VIRTUAL)

- Eli Kinigstein, “XTA Spectroscopy with X-ray Multiprobe Data Acquisition”. A video of my presentation can be found [here](#).

Sydney, Australia

July 2021

APS March Meeting

PRESENTATION

- Eli Kinigstein, “Exciton Dissociation at Grain Boundaries in Lead Halide Ruddlesden Popper Perovskite Thin Films”.

Los Angeles, CA

March 2018

CLEO

PRESENTATION

- Eli Kinigstein, “Ultra-fast Optical Properties of PbSe Nano-Rods: One Dimensional Excitons”.

San Jose, CA

June 2014

International Conference on Quantum Dots 2014

POSTER PRESENTATION

- Eli Kinigstein, “Ultra-fast Optical Properties of PbSe Nano-Rods: One Dimensional Excitons”.

Pisa, Italy

May 2014

Ongoing Projects

Building microfluidic electrochemical cell for time-resolved X-ray spectroscopy

IN COLLABORATION WITH PROF. SARAH PERRY (UMASS AMHERST)

Ithaca, NY

August 2025 – Present

Understanding insulator-to-metal phase transition using time-resolved X-ray scattering

IN COLLABORATION WITH PROF. ANKIT DISA AND PROF. ANDREJ SINGER (CORNELL UNIVERSITY)

Ithaca, NY

May 2025 – Present

De-mixing time-resolved spectroscopy using neural network

PROJECT SUPERVISOR FOR THE SUMMER UNDERGRADUATE RESEARCH PROGRAM AT CORNELL AI-MI

Ithaca, NY

May 2026 – Present

Skills

X-Ray Synchrotron

- Time resolved x-ray scattering and spectroscopy instrumentation, data acquisition, analysis, and beamline user support.
- Time resolved optical spectroscopy (transient absorption spectroscopy, time resolved photoluminescence) instrumentation, data acquisition, and analysis.
- In-situ pair distribution function experimental techniques and data analysis techniques.
- Single-element detector design and engineering.

Programming

- Python, PyTorch
- MATLAB
- Slurm
- Parallel GNU

Detector Engineering

- Analog radio frequency circuit board design
- Cadence PSpice circuit simulations
- Transimpedance amplifier design

Honors & Awards

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|------|---|-----------------------|
| 2018 | Recipient , 5 times awarded Columbia Graduate Teaching Fellowship | <i>New York, NY</i> |
| 2014 | Recipient , Columbia NSF IGERT Fellowship | <i>New York, NY</i> |
| 2013 | Recipient , Columbia NSF IGERT Fellowship | <i>New York, NY</i> |
| 2011 | Recipient , 7 times awarded University of Vermont's Henderson Grant | <i>Burlington, VT</i> |
| 2011 | Recipient , 8 times awarded University of Vermont's Presidential Scholarship | <i>Burlington, VT</i> |
| 2011 | Recipient , 3 times awarded University of Vermont's Urban Scholarship | <i>Burlington, VT</i> |
| 2011 | Recipient , 8 times awarded University of VT Grant | <i>Burlington, VT</i> |
| 2011 | Recipient , 8 times awarded the JetBlue Scholarship | <i>Burlington, VT</i> |