

appointments

Kenyon College, Gambier, Ohio

Assistant Professor of Physics

2005-present

education

Cornell University, Ithaca, New York

Postdoctoral Associate, present

2002-2005

Northwestern University, Evanston, Illinois

Ph.D., Physics and Astronomy, 12/2002

1996-2002

Berea College, Berea, Kentucky

B.A. in Physics, minor in German, 05/1996

1991-1996

teaching

- **Classes taught at Kenyon College:** Fields and Spacetime with Lab, General Physics, and First-Year and Intermediate Seminars in Physics: Biological Physics.
- **Taught as a part of teaching assistantship** (Northwestern University)
 1. Instructed undergraduate discussion sections (1 year)
 2. Guided undergraduate laboratories (1 semester)
 3. Was competitively selected to help teaching physics in the Integrated Science Program, a highly selective curriculum of natural sciences and mathematics presented predominantly in small classes at an accelerated pace (1 year); total of T.A. experience: 2 years
- **Taught as a part of work-study program** (Berea College)
 1. Helped with setting up labs, tutored younger peers, helped with grading (3 years)
 2. Gave guided planetarium tours in the local planetarium to scientific and non-scientific audiences (1 year)

research

Soft condensed matter, experiment

Interdisciplinary Expertise:

- Materials problems in macromolecular crystallography; studies of radiation sensitivity of biological crystals to synchrotron x-rays; design of new crystal holders made by lithography techniques (suitable for handling ultra-small crystals).
- Physics of thin films on aqueous substrates (Langmuir monolayers); initial stages of template-directed crystal nucleation (biomineralization); strain relaxation (change in interatomic spacing) at organic-inorganic interfaces; aqueous chemistry of inorganic molecules and their interactions with Langmuir monolayers;

Techniques:

Versed in multiple x-ray techniques: macromolecular crystallography, grazing incidence synchrotron x-ray diffraction, x-ray reflectivity, and extended x-ray absorption fine structure

skills and experience

- **Technical:** Experienced user at the Cornell High Energy Synchrotron Source, Ithaca, NY; the Advanced Photon Source, Argonne, IL; and the National Synchrotron Light Source, Upton, NY
- **Analytical:** Inductively Coupled Plasma-Atomic Emission Spectrometry, UV-VIS Spectrophotometry, Matrix-assisted Laser Desorption/Ionization, Polyacrylamide gel electrophoresis, gel filtration chromatography
- **X-tal Programs:** Mosflm, CCP4 crystallographic suite, Denzo, Scalepack

- **Hardware:** Designed and interfaced a motion control system (stepper motors) for controlling an x-ray setup in special synchrotron applications.
- **Programming:** Proficient in Delphi, HTML, CGI/Perl, Mathematica, Microcal Origin; maintained group's web-page; managed a small computer network.

publications (peer-reviewed)

Kewalramani S, **Kmetko J**, Dommett G, Kim K, Evmenenko G, Mo H, and Dutta P, "Pathways for oriented assembly of inorganic crystals at organic surfaces," *Thin Solid Films* 515, 5627 2007

Kmetko J, Husseini NS, Naides M, et al., "Quantifying X-ray radiation damage in protein crystals at cryogenic temperatures" *Acta Cryst. D*, 62: 1030-1038 2006

Isakovic AF, Evans PG, **Kmetko J**, et al., "Shear modulus and plasticity of a driven charge density wave," *Phys. Rev. Lett.* 96 (4): Art. No. 046401 2006

Kmetko J, Kewalramani S, Evmenenko G, Yu CJ, and Dutta P, "Bioinspired Inorganic Film Growth at Organic Templates" *Int. J. Nanoscience* 4: 849-854 2005

Isakovic AF, Evans PG, Cai Z, Lai B, **Kmetko J**, Cicak K, Thorne RE, "Transverse correlations and plasticity in the CDW conductor NbSe₃ studied by X-ray microbeam diffraction," *J. de Phys. IV* 131: 139-142 2005

Kewalramani S, Evmenenko G, Yu CJ, Kim K, **Kmetko J**, Dutta P., "Evidence of surface reconstruction during 'bioinspired' inorganic nucleation at an organic template," *Surface Science* 591 (1-3): L286-L291 2005

Kalinin Y, **Kmetko J**, Bartnik A, et al., "A new sample mounting technique for room-temperature macromolecular crystallography," *J. Appl. Cryst.*, 38: 333-339 2005

Thorne RE, Stum Z, **Kmetko J**, O'Neill K, Gillilan R
"Microfabricated mounts for high-throughput macromolecular cryocrystallography"
J. Appl. Cryst. 36: 1455-1460 2003

Yu CJ, Evmenenko G, **Kmetko J**, Dutta P
"Effects of shear flow on interfacial ordering in liquids: X-ray scattering studies"
Langmuir 19 (23): 9558-9561 2003

Kmetko J, Yu C, Evmenenko G, Kewalramani S, Dutta P
"Organic-template-directed nucleation of strontium fluoride and barium fluoride: Epitaxy and strain"
Phys. Rev. B 68 (8): Art. No. 085415 2003

Boyanov MI, **Kmetko J**, Shibata T, Datta A, Dutta P, Bunker BA
"Mechanism of Pb adsorption to fatty acid langmuir monolayers studied by X-ray absorption fine structure spectroscopy"
J. Phys. Chem. B 107 (36): 9780-9788 2003

Evmenenko G, van der Boom ME, Yu CJ, **Kmetko J**, Dutta P
“Specular X-ray reflectivity analysis of adhesion interface-dependent density profiles in nanometer-scale siloxane-based liquid films”
Polymer 44 (4): 1051-1056 2003

Kmetko J, Yu CJ, Evmenenko G, Kewalramani S, Dutta P
“Evidence of registry at the interface during inorganic nucleation at an organic template”
Phys. Rev. Lett. 89 (18): Art. No. 186102 2002

Evmenenko G, Yu CJ, **Kmetko J**, Dutta P
“Density anomalies in thin liquid films of hydride functional siloxanes”
Langmuir 18 (14): 5468-5472 2002

Richter AG, Yu CJ, Datta A, **Kmetko J**, Dutta P
“Using X-rays to characterize the process of self-assembly in real time”
Colloid Surface A 198: 3-11 Sp. Iss. SI 2002

Kmetko J, Datta A, Evmenenko G, Dutta P
“The effects of divalent ions on Langmuir monolayer and subphase structure: A grazing-incidence diffraction and Bragg rod study”
J. Phys. Chem. B 105 (44): 10818-10825 2001

Yu CJ, Evmenenko G, Richter AG, Datta A, **Kmetko J**, Dutta P
“Order in molecular liquids near solid-liquid interfaces”
Appl. Surf. Sci. 182 (3-4): 231-235 Sp. Iss. SI 2001

Evmenenko G, van der Boom ME, **Kmetko J**, Dugan SW, Marks TJ, Dutta P
“Specular x-ray reflectivity study of ordering in self-assembled organic and hybrid organic-inorganic electro-optic multilayer films”
J. Chem. Phys. 115 (14): 6722-6727 2001

Kmetko J, Datta A, Evmenenko G, Durbin MK, Richter AG, Dutta P
“Ordering in the subphase of a langmuir monolayer: X-ray diffraction and anomalous scattering studies”
Langmuir 17 (16): 4697-4700 2001

Evmenenko G, Dugan SW, **Kmetko J**, Dutta P
“Molecular ordering in thin liquid films of polydimethylsiloxanes”
Langmuir 17 (13): 4021-4024 2001

Yu CJ, Richter AG, **Kmetko J**, Dugan SW, Datta A, Dutta P
“Structure of interfacial liquids: X-ray scattering studies”
Phys. Rev. E 63 (2): Art. No. 021205 2001

Dutta A, **Kmetko J**, Yu CJ, Richter AG, Chung KS, Bai JM, Dutta P.
“pH-dependent appearance of chiral structure in a Langmuir monolayer”
J. Phys. Chem. B 104 (24): 5797-5802 2000

Yu CJ, Richter AG, **Kmetko J**, Datta A, Dutta P

“X-ray diffraction evidence of ordering in a normal liquid near the solid-liquid interface”

Europhys. Lett. 50 (4): 487-493 2000

Datta A, **Kmetko J**, Richter AG, Yu CJ, Dutta P, Chung KS, Bai JM

“Effect of headgroup dissociation on the structure of Langmuir monolayers”

Langmuir 16 (3): 1239-1242 2000

Richter AG, Yu CJ, Datta A, **Kmetko J**, Dutta P

“In situ and interrupted-growth studies of the self-assembly of octadecyltrichlorosilane monolayers”

Phys. Rev. E 61 (1): 607-615 2000

Durbin MK, Richter AG, Yu CJ, **Kmetko J**, Bai JM, Dutta P

“Backbone orientational order in fatty acid monolayers at the air-water interface”

Phys. Rev. E 58 (6): 7686-7690 1998