Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.
Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.
Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.

**GAANN FELLOW**

**Katie Hills-Kimball**  
Graduate Student/Chemistry  
**Co-Mentors:** Ou Chen/Nitin Padture  
**Thesis Topic:** Solid-liquid-solid exchange reactions in lead halide perovskite nanocrystals.

**CONFERENCES/PRESENTATIONS**


**LIST OF PUBLICATIONS**


Solid-Liquid-Solid exchange reactions were performed on methylammonium lead halide perovskite nanocrystals to yield formamidinium lead halide perovskite nanocrystals.

A) Schematic Image of cation exchange in hybrid organic-inorganic perovskite nanocrystals through a solid-liquid-solid exchange process.

B) Mixed halide perovskite nanocrystals synthesized via the solid-liquid-solid cation exchange.

C) Corresponding photoluminescence spectra of the mixed halide perovskite nanocrystals spanning the visible region of the electromagnetic spectrum.
GAANN FELLOW

Laura Turcer
Graduate Student/Engineering
Co-Mentors: Nitin Padture/Reid Cooper
Thesis Topic: High Temperature Interactions between Environmental Barrier Coating (EBC) Ceramics and Calcia-Magnesia-Alumino-Silicate (CMAS) Glass

LIST OF PUBLICATIONS


CONFERENCES/PRESENTATIONS

“High Temperature Interactions between Environmental Barrier Coating Ceramics and Calcium-Magnesium-Alumino-Silicate (CMAS) Glass”. (Poster) September 2017, IMNI’s 10th Anniversary – Competition/Poster Session.

“High Temperature Interactions between Environmental Barrier Coating (EBC) Ceramics and Calcia-Magnesia-Alumino-Silicate (CMAS) Glass” (Presenting Author) January 2017, ICACC.


Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.
GAANN FELLOW

Elizabeth Leary
Graduate Student/BioMed
Co-Mentors: Jeffery Morgan/Edith Mathiowitz
Thesis Topic: Advancing the use of 3D spheroids for quantitative, high-throughput assays in order to develop predictive models to study particle penetration and its subsequent biological effects.

LIST OF PUBLICATIONS


CONFERENCES/PRESENTATIONS


“Quantifying biological functions using fluorescent dyes in 3D spheroids”. Leary E, Morgan JR. Biomedical Engineering Society. 2014.

Figure. Monitoring particle penetration and movement throughout 3D spheroids. Ovarian granulosa cell line (KGN), cultured as 2D cell monolayers, was labeled with the fluorescent dye, CellTracker Red CMPTX. Cells were trypsinized, counted, and mixed with varying amounts of fluorescent PC-red microparticles, and seeded into agarose hydrogels to form spheroids. After 24-hour, confocal images were obtained and reconstructed. Representative images for 1 bead (A), 100 beads (B), and 10,000 beads (C) per spheroid are shown.
**Former GAANN FELLOW**

**STEVEN AHN**

Graduate Student/Engineering  
**Co-Mentors:**  
Tayhas Palmore/Wesley Bernskoetter  
**Thesis Topic:** Homeogeneous, heterogeneous, and chemically-modified electrode systems for electrocatalytic reduction of carbon dioxide

**LIST OF PUBLICATIONS**


**CONFERENCES/PRESENTATIONS**


March, 2015: **NSF CCI Reverse Site Visit**, “Electrochemical Reduction of CO2 to Formic Acid Using a Pincer-Supported Iridium Catalyst” and “Mentoring Underrepresented Groups”.

May, 2015: **Cabot Corporation Student Material Research Forum**, “Electrochemical Reduction of CO2 to Formic Acid by an Iridium Pincer Complex”.

Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.
FORMER GAANN FELLOW
MEGAN CREIGHTON
Graduate Student/Engineering
Co-Mentors:
Robert Hurt/Agnes Kane
Thesis Topic:
Artifacts Caused by Graphene-Family Materials in Biological Systems

CONFERENCES/PRESENTATIONS

May, 2011: 21st Society of Environmental Toxicology and Chemistry European Annual Meeting in Milan, Italy. Presented “In Vitro Biological Responses to 1D and 2D Nanomaterials: Carbon Nanotubes and Graphene”.

Selected images demonstrating cellular interaction and phagocytosis. A) Incomplete phagocytosis of a large thin graphite flake by multiple macrophages after 24 hours. The upper arrow indicates graphenic surface protruding through the membrane, the bottom arrow indicates the lower limit of the cellular coating. B) Cellular membrane protrusions extending over a GS-25 sheet after 3 hours. C) Incomplete phagocytosis of a GS-5 sheet and focal plasma membrane injury after 6 hours. D) A larger flake from the GS-5 sample coated with cellular material after 24 hours, likely by one or more macrophages visible on the backside of the flake. Scale bar = 2 µm

Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.
Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.

**Former GAANN FELLOW**

**JONATHAN ESTRADA**  
Graduate Student/Engineering  
Co-Mentors:  
Christian Franck/Diane Hoffman-Kim  
Thesis Topic: Microcavitation as a Neuronal Damage Mechanism in Blast Traumatic Brain Injury

**CONFERENCES/PRESENTATIONS**


**LIST OF PUBLICATIONS**


Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.

**LIST OF PUBLICATIONS**


Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.

**Former GAANN FELLOW**

**AMANDA KRAUSE**

Graduate Student/Engineering

**Co-Mentors:**

Nitin Padture/Reid Cooper

**Thesis Topic:** Calcia-Magnesia-Aluminosilicate Attack and Mitigation Mechanisms in Air Plasma Sprayed Thermal Barrier Coatings

**List of Publications**

**Presentations/Conferences**

July 2014: *Thermal Barrier Coatings IV* in Irsee, Germany. “Degradation and Delamination of Thermal Barrier Coatings Exposed to CMAS Deposits in Gas-Turbine Engines and its Mitigation” (Poster).


7wt.% Yttria stabilized ZrO2 thermal barrier coatings, used in turbine engines, are susceptible to failure due to CaO-MgO-Al2O3-SiO2 deposits. A TBC material, Y2O3·2ZrO2, was developed that mitigates penetration to allow longer service life.
Former GAANN FELLOW

JONATHAN KURVITS
Graduate Student/Chemistry
Co-Mentors:
Rashid Zia/Kristie Koski
Thesis Topic: Characterization of the Order and Orientation of Electronic Transitions from Luminescent Thin Films

List of Publications

S. Cueff, D. Li, Y. Zhou, F. Wong, J.A. Kurvits, S. Ramanathan, and R. Zia. “Leveraging VO2 phase-change to circumvent the lifetime limit for modulating erbium light emission.” (Submitted to Nature Nanotechnology)


Presentations/Conferences


Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.
Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.

**LIST OF PUBLICATIONS**


The above is a synthetic strategy towards generation of a DNA-based hybridization probe capable of signal off-on behavior with magnetic resonance. Similar to fluorescent molecular beacon probes, which yield a fluorescent "on" signal when the DNA probe hybridizes to an mRNA target of interest, these magnetic resonance probes are being designed to exhibit an NMR signal *only* when in the presence of a target molecule and remain "off" otherwise. The probe functions through the paramagnetic relaxation enhancement effect, by which the gadolinium relaxes the fluorine resonance in a magnetic field when in close proximity.
FORMER GAANN FELLOW

JENNIFER MITCHEL

 Graduate Student/Biomedical Engineering

Co-Mentors:  Diane Hoffman-Kim/Edith Mathiowitz

Thesis Topic:  Aligned and Asymmetric Environmental Cues to Direct Nerve Guidance and Cell Migration

LIST OF PUBLICATIONS


CONFERENCES/PRESENTATIONS

October, 2011:  Biomedical Engineering Society Annual Meeting in Hartford, CT.  Presented “Matlab-Based Algorithm for Automatic Tracing of Confluent Neuronal Images”.


October, 2010:  Biomedical Engineering Society Annual Meeting in Austin, TX.  Presented “Guided Schwann Cell Motility on Cellular-Scale Anisotropic Topography”.

Asymmetric Topography Pilot Study

Materials:  Polymer surfaces with raised asymmetric topography

Experiment:  Neural tissue explant cultured on smooth or asymmetric materials for 3 days

Trends:  Toward asymmetric growth

Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.
FORMER GAANN FELLOW
ANTON TOKRANOV
Graduate Student/Engineering
Co-Mentors: Brian Sheldon/Kyung-Suk Kim
Thesis Topic: Surface Reactions and Concomitant Stress Evolutions in Graphitic Thin Film Electrodes in Li-Ion Battery Proteins

LIST OF PUBLICATIONS
A. Mukhopadhyaya, A. Tokranov, K. Sena, Xingcheng Xiaob, B.W. Sheldon, "Thin film graphite electrodes with low stress generation during Li-intercalation", Carbon, (2011), (49) 8, 2742-2749.

CONFERENCES/PRESENTATIONS
Nov. 28th through Dec. 2nd, 2011: Fall MRS Meeting in Boston, MA. Presented “Surface Reactions and Concomitant Stress Evolutions in Graphitic Thin Film Electrodes in Li-Ion Battery”.
April, 2011: 2011 Rhode Island Nanotechnology Showcase in Providence, RI. Presented “In situ determination of stress evolution in composite electrode materials for Li-ion batteries”.

Financial support was provided in part by the US Department of Education through GAANN Award P200A120064, administered by IMNI at Brown University.

TEM Observations on CLC Carbon
- Graphene fringes can be seen in planar view TEM image
- Graphene sheets are perpendicular to substrate
- Graphene have random orientation in the lateral direction (c-axis; parallel to substrate) for spin coated film
- Graphene layers are directionally oriented in the lateral direction (c-axis; parallel to substrate) for bar coated film