

**2019 WEEKLY BULLETIN**  
**DEPARTMENT OF CHEMISTRY, NORTHWESTERN UNIVERSITY**  
**EVANSTON, ILLINOIS**  
**March 4, 2019**

*For full schedule, including Center events, please see the Department Calendar:*  
<http://www.chemistry.northwestern.edu/events/calendar.html>

Tuesday March 5<sup>th</sup>:                    *Faculty Lunch Seminar: Sam Stupp*  
Tech K140  
12:00-1:00pm

Wednesday March 6<sup>th</sup>:                *Department of Chemistry Colloquium:*  
*Alex Grenning, University of Florida*  
Ryan 4003  
11:00am-12:00pm

**Arrivals**

Nicolas Diercks joined the Mirkin Group  
Minglu Huang joined the Marks Group  
Michael Wojnar joined the Freedman Group

**BIP**

BIP every Friday at 10:00 am in Tech K140

**Announcements**

The application window for the 13<sup>th</sup> annual Building Engineering and Science Talent (*BEST*) Symposium, hosted by The Dow Chemical Company, will be open March 1 - April 15, 2019.

The *BEST* symposium will be held in Midland, MI on **July 30 – August 1, 2019**. The *BEST* Symposium introduces doctoral students and post-doctoral scientists from U.S. ethnic minority groups (Hispanic, African American or Native American) to the wide range of rewarding careers in industrial research, particularly, the many opportunities available with Dow, where we create innovation at the intersection of chemistry, engineering, and physics. This conference, developed jointly by Dow's minority scientists and Ph.D. recruiting team, supports the company's commitment to a diverse and inclusive work force.

Applicants must be pursuing degrees in:

- Chemistry
- Chemical Engineering
- Materials Science
- Physics
- Or other closely related fields and should be within 18 months of degree completion by the conference date.

For more information please visit the [website](#). All applications are due by April 15<sup>th</sup>, 2019.

## Opportunities

**The National Renewable Energy Laboratory (NREL)** is a leader in the U.S. Department of Energy's effort to secure an energy future that is both environmentally and economically sustainable. With locations in Golden, Boulder and Washington D.C., NREL is the primary laboratory for research, development and deployment of renewable energy technologies in the United States. The NREL mission is to develop renewable energy and energy efficient technologies and practices, advance related science and engineering, and transfer knowledge and innovation to address the nation's energy and environmental goals.

NREL's Chemistry and Nanoscience Department has an opening for a Postdoctoral Researcher specializing in quantum dot film fabrication and characterization. The successful applicant will have expertise in synthesizing semiconductor nanocrystals and fabricating conductive QD arrays. The successful candidate should be familiar with standard characterization such as ultrafast spectroscopy, conductivity measurements and solar cell characterization. Additionally the successful applicant should have expertise in data analysis, simulation of experimental results and writing of manuscripts. The successful applicant will have the ability to work with material scientist to probe and understand surfaces and interfaces of newly developed chemistries and heteroarchitectures.

### Basic Qualifications

Must be a recent PhD graduate within the last three years.

### Additional Qualifications

#### Preferred Qualifications

Our ideal candidate will have just received a Ph.D in physics, chemistry, optics, or the equivalent, as well as having experience working with quantum dots and methods, data collection, and simulating experimental results. Experience fabricating conductive quantum dot arrays, new quantum dot systems, core/shell and synthesizing other shapes is also desired. Direct experience with QD systems.

### Submission Guidelines

Please note that in order to be considered an applicant for any position at NREL you must submit an application form for each position for which you believe you are qualified. Applications are not kept on file for future positions. Please include a cover letter and resume with each position application.

[https://nrel.wd5.myworkdayjobs.com/en-US/NREL/job/Golden-CO/Postdoctoral-Researcher---Quantum-Dot-Film-Fabrication-and-Characterization\\_R4037](https://nrel.wd5.myworkdayjobs.com/en-US/NREL/job/Golden-CO/Postdoctoral-Researcher---Quantum-Dot-Film-Fabrication-and-Characterization_R4037)

**The National Renewable Energy Laboratory (NREL)**, located at the foothills of the Rocky Mountains in Golden, Colorado, is the nation's primary laboratory for research and development of renewable energy and energy efficiency technologies. A postdoc position is available in the Materials Science Center, in the area of thin film synthesis and characterization of novel materials for application in next-generation Li-ion battery technologies

The position would support a collaborative project on solid-electrolyte interphases (SEI) of Si-based anode materials in Li-ion batteries. Specific duties would involve physical vapor deposition (e.g., magnetron sputtering, pulsed laser deposition) of thin films that can be used as model systems for such studies. The work would also include studying solid state components of the SEI, such as lithium silicate, lithium silicide, and other constituents, as well as developing artificial layers that can help understanding the SEIs. The job duties would also include maintaining existing experimental synthesis equipment and protocols, as well as setting up new characterization tools compatible with thin film sample studies.

### Basic Qualifications

Must be a recent PhD graduate within the last three years.

#### Additional Qualifications

#### Preferred Qualifications

Successful candidates should have prior experience in materials research for battery applications, solid understanding of the underlying electrochemical processes, and proven track record with electrochemical and spectroscopic characterization instruments. Other preferred skills include hands-on experience with thin film synthesis (sputtering, pulsed laser deposition, molecular beam epitaxy) and thin film characterization (chemical, structural, microscopic). Prior experience with automation of instruments and development of software would be a plus.

#### Required Knowledge Skills and Attributes

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[https://nrel.wd5.myworkdayjobs.com/en-US/NREL/job/Golden-CO/Postdoctoral-Researcher--Thin-Film-Materials-for-Li-ion-Battery-Research\\_R3673](https://nrel.wd5.myworkdayjobs.com/en-US/NREL/job/Golden-CO/Postdoctoral-Researcher--Thin-Film-Materials-for-Li-ion-Battery-Research_R3673)

**NREL's Transportation and Hydrogen Systems Center** has a research position available in battery life testing and life-predictive modeling. The selected candidate will be responsible for conducting aging tests on Li-ion batteries and developing aging models of batteries capturing electrochemical degradation mechanisms, validating and integrating those models within NREL's computational battery modeling frameworks. The selected candidate will develop new and apply existing battery simulation software to investigate and optimize performance and lifetime of lithium-ion batteries for electric-drive vehicles and renewable energy applications. The selected candidate will further be responsible for developing new experimental techniques to isolate aging mechanisms. This position will support R&D conducted in-house and externally by NREL researchers and university and industry participants.

#### *Job Duties*

*Job duties include, but not limited to:*

- Design and carry out life-cycle experiments to measure Li-ion battery capacity fade and resistance growth under different storage and charge/discharge aging conditions.
- Use existing in-house software to perform parameter identification and develop life models of multiple Li-ion battery technologies. Integrate those life models into other techno-economic/systems analysis models. Support vehicle and grid energy storage lifetime and control studies.
- Work with team to formulate physics models of electrochemical/mechanical degradation mechanisms and integrate those models into NREL's multi-scale multi-domain (MSMD) battery modeling software.
- Develop new experiments, test fixtures and test procedures to isolate and quantify individual degradation mechanisms. Use data to validate degradation physics models.
- Tear down aged cells. Work with team and external partners to carry out supporting chemical analysis and microscopy studies of aging behavior.
- Improve performance and lifetime of Li-ion battery units through simulation-based analysis.
- Document work in detailed technical memos, laboratory notebooks, milestone reports, and journal articles and present at technical conferences.

#### Required Education, Experience, and Skills

Must be a recent Ph.D. graduate within the last three years.

#### Preferred Qualifications

Demonstrated research capability to solve challenging problems. Experience with battery galvanostatic/potentiostatic and electrochemical impedance spectroscopy tests and equipment. Familiarity

with cell tear-down and fabrication procedures, chemical, structural, tomography and microscopy analysis techniques. Programming experience in C, C++, MATLAB, Python, LabView, and/or dSPACE. Knowledge of Modbus, CAN, J1939 and other communication protocols. Familiarity with commercial finite element analysis (FEA) software packages such as COMSOL and ANSYS, and/or computational fluid dynamics (CFD) software such as FLUENT and STAR-CCM+. Understanding of numerical solution of partial differential equations. Previous research or practical experience proposing, formulating and solving physics-based models of multi-scale reaction-transport systems such as lithium-ion batteries. Prior experience developing tests to validate those models. Experience designing laboratory experiments and analyzing data. Excellent interpersonal, communication, writing and documentation skills. Demonstrated team work, creativity, innovation, and adaptability.

*Desired Education, Experience, and Skills*

- PhD. in relevant chemistry, electrochemistry, mechanical, chemical engineering or related discipline with 3.0 GPA or higher.
- Experience conducting aging test campaigns on Li-ion cells, including custom fixture design, setting up tests, programming battery cyclers and monitoring, reducing, interpreting and presenting data.
- Experience in modeling and simulation of thermal, chemical, and electrochemical energy storage devices or systems.
- Experience in modeling degradation and lifetime of Li-ion batteries.
- Programming experience in Matlab.

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[https://nrel.wd5.myworkdayjobs.com/en-US/NREL/job/Golden-CO/PostDoc-Position--Battery-Life-Testing-and-Modeling\\_R4172](https://nrel.wd5.myworkdayjobs.com/en-US/NREL/job/Golden-CO/PostDoc-Position--Battery-Life-Testing-and-Modeling_R4172)

**A Synthetic Organic Medicinal Chemistry Postdoctoral position** available in the Lapinsky lab (<http://www.duq.edu/academics/faculty/david-lapinsky>) in the Division of Pharmaceutical Sciences at Duquesne University in Pittsburgh, PA (<http://www.duq.edu/>). The position is open immediately, with start dates through late 2019 being given consideration.

The Postdoc will address the major theme in the lab of developing chemical probes for target identification of hit compounds originating from phenotypic screening campaigns.

What we do: Our recent activities are summarized on the website:

<http://www.duq.edu/academics/faculty/david-lapinsky>

The interested candidate:

- must hold a Ph.D. in organic or medicinal chemistry, or a related field (e.g., chemical biology).
- must have strong expertise in organic synthesis, with a publication record demonstrating independence in research focus
- must have the ability to communicate clearly in writing, as well as verbally with a diverse set of collaborators
- must have a strong team spirit and excellent interpersonal skills
- must have excellent synthetic organic chemistry experience, literature search skills, and be able to derive the best routes for organic syntheses; additionally, the candidate should be knowledgeable in analytical methods of organic chemistry (e.g., NMR, MS, chromatography, etc.)

Eligibility: Completion of a Ph.D. is required by start date.

How to apply: Applications will be accepted immediately and candidates will be considered until the position is filled. To be considered, all applicants must submit a cover letter, CV, a one-page "Research Statement" describing research experience and how this aligns with the focus of the Lapinsky group, and the names/phone numbers of three references. A single PDF document should be sent to Dr. David Lapinsky ([lapinskyd@duq.edu](mailto:lapinskyd@duq.edu)). Salary will be commensurate with accomplishment, fit, and experience.

The environment: Located in Pittsburgh, Duquesne University provides a rich intellectual environment and cutting-edge facilities for its researchers, who conduct studies at the forefront of basic biomedical science, drug discovery, and technology development.

**UES, Inc in Dayton, Ohio** has an opportunity available for a research scientist to join our team working with the 711th Human Performance Wing at Wright Patterson Air Force Base. This position will support research in the area of sensor development related to the selection of recognition elements (peptides and nucleic acids) using high throughput instrumentation and their integration in different sensor platforms. Experience in the synthesis and characterization of nanomaterials and their use in assay development is required, as well as experience with handling biomaterials (DNA, RNA, etc.). Knowledge of techniques to select DNA and peptides recognition elements is beneficial, but not essential. Some of the primary functions for this role will include:

- Conducting lab experiments related to selection of recognition elements
- Characterization of binding affinity and integration of binders and sensors
- Supporting collaborations with external partners
- Presentations of results at meetings and conferences

#### Requirements

- Ph.D. in chemistry, biochemistry, nanotechnology or a related discipline is required
- Proficiency with general chemistry and biochemistry laboratory techniques is required
- Experience with nucleic acid and peptides binding, synthesis, and characterization of nanomaterials is required
- Knowledge of sample preparation techniques for sensor systems is desired
- This position will require strong verbal and written communication skills and the ability to work in a multidisciplinary team environment
- This position is working within a government facility and requires U.S. Citizenship

#### Additional Information

UES, Inc. is an innovative science and technology company providing customers with superior research and development expertise since its inception in 1973. Our long-term success is a direct result of a strong commitment to the success of our employees. We look forward to reviewing your application.

UES is firmly committed to Equal Employment Opportunity (EEO) and prohibits employment discrimination for employees and applicants based on age, race, color, pregnancy, gender, gender identity, sexual orientation, national origin, religion, marital status, citizenship, or because he or she is an individual with a disability, protected veteran or other status protected by federal, state and local laws.

**Argonne National Laboratory/Solar Energy Conversion Group** is accepting applications for a postdoctoral appointee position. Under the guidance of a supervisor, conduct fundamental research on solar energy conversion in natural photosynthetic systems and design biohybrid complexes for solar-driven fuels production. Research includes protein bioinorganic and biochemistry techniques, the

development of methods to augment native and modified photosynthetic protein frameworks with abiotic cofactors, and the characterization of structure-function relationships in hybrid assemblies using a range of spectroscopic techniques.

Participates in protein expression, isolation, and characterization. Develops bioinorganic methods for protein modification enabling the insertion of abiotic cofactors into photosynthetic protein frameworks. Characterizes the structure, electron transfer properties, and catalytic function of native protein-protein interactions and hybrid assemblies using a range of biophysical spectroscopic techniques. Analyzes data, prepares manuscripts for submission to peer-reviewed publications, and makes presentations at scientific meetings. Maintains comprehensive knowledge of pertinent literature. Develops new ideas, concepts, and/or research proposals.

**Position Requirements:**

Considerable knowledge of and experimental expertise in one or more of the following areas: Protein isolation, protein modification, protein function characterization, protein cofactor characterization, protein structure characterization.

Good interpersonal, verbal, and written communication skills. Good skill in data processing, evaluation, and interpretation. Good skill in working in an interdisciplinary research team setting.

Some knowledge of and experimental expertise in protein design and expression using recombinant DNA and microbial protein expression techniques, organic/inorganic chemistry, biophysics, optical and EPR spectroscopy.

This level of knowledge is typically achieved through a formal education in bioinorganic chemistry, biochemistry, or biophysical chemistry or related disciplines at the Ph.D. degree level with 0 to 3 years of experience or equivalent in the scientific application of this knowledge and practical laboratory experience. <https://blogs.anl.gov/solar-energy/>

Please contact Supervisor Lisa M. Utschig directly for more information: [utschig@anl.gov](mailto:utschig@anl.gov)  
<https://www.anl.gov/profile/lisa-m-utschigjohnson>

Position open immediately!