

**2019 WEEKLY BULLETIN**  
**DEPARTMENT OF CHEMISTRY, NORTHWESTERN UNIVERSITY**  
**EVANSTON, ILLINOIS**  
**April 1, 2019**

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

Thursday April 4<sup>th</sup>:                    *Department of Chemistry Special Colloquium:*  
   *Professor Zhihao Zhuang, University of Delaware*  
   Ryan 4003  
   4:00-5:00pm

Friday April 5<sup>th</sup>:                    *Department of Chemistry Colloquium:*  
   *Lasse Jensen, Pennsylvania State University*  
   Tech LR3  
   4:00-5:00pm

**Arrivals**

We did not have any new arrivals

**BIP**

BIP every Friday at 10:00 am in Tech K140

**Announcements**

**Industrial Associates:** Grad students and postdocs who have submitted abstracts for Industrial Associates should be receiving invitations to the reception on May 1. If you do not receive an invitation by April 3, please email Sophie Tidd at [sophie.tidd@northwestern.edu](mailto:sophie.tidd@northwestern.edu) to follow up

**BEST Symposium:** 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

**At Novartis**, we are committed to training the next generation of scientific leaders. The Novartis Innovation Postdoctoral Fellowship offers aspiring drug hunters a unique opportunity to join our teams at the Novartis Institutes for BioMedical Research (NIBR), the innovation engine of Novartis. Mentored by NIBR scientific leaders, Innovation Fellows will gain first-hand experience in the design and development of breakthrough therapies and innovative technologies. We are looking for Innovation Fellows who will bring their scientific creativity and natural curiosity to tackle important therapeutic challenges. Join us as we reimagine medicine together.

### Program highlights

- Program duration: 2-3 years
- Boot camp: Innovation Fellows will attend a fully immersive boot camp covering the fundamentals of drug discovery and development
- Mentorship & access to technology: Innovation Fellows will have access to NIBR state-of-the-art technology platforms and be mentored by selected NIBR scientific leaders
- Rotations: Innovation Fellows will benefit from a tailored rotation schedule in both scientific and business-related disciplines
- Fireside chats with local leaders in academia and industry
- Community: Innovation Fellows will join Discovery Fellows in our vibrant postdoctoral community with dedicated events, including our annual Research Day Symposium

### Who are the Innovation Fellows?

- Early-career scientists, within 3 years of receiving their MD and/or PhD (students in their last 4 months of graduation are eligible to apply)
- All scientific and technical disciplines welcome (e.g. biology, biophysics, chemical biology, chemistry, computational and data sciences, engineering, and more)
- Strong publication track record or other scientific achievements
- Entrepreneurial mindset and boundless curiosity
- Dedicated to translating scientific discoveries into medicines that improve human health

### How to Apply

- Please submit your CV and cover letter by May 1, 2019 for consideration. Include a potential area of unmet medical need where you believe you could make an impact.
- All applications will be evaluated by a review team comprised of discipline experts and drug hunters from NIBR.
- Candidates selected as finalists will be invited to our Cambridge, MA campus for an all-day interview in June 2019. New Innovation Fellows will start in September 2019 at our Cambridge site.

Apply (<https://www.novartis.com/careers/career-search/job-details/262871BR>)

If you have any questions, please contact us at [nibr.postdoc@novartis.com](mailto:nibr.postdoc@novartis.com).

**Earli** is currently seeking high-caliber non-viral nucleic acid Delivery Scientist / Bioengineer candidates.

Earli Inc. has a large mission: to detect and then cure cancer at its earliest stages, effortlessly and painlessly. In other words, we aim to make cancer a benign experience. Our science is based on a new method of detecting, localizing and then treating cancer, developed by Dr. Sam Gambhir, who runs Stanford's Canary Center for Early Cancer Detection. Earli is starting what we believe will be a new era of "synthetic biomarkers." Rather than relying on hard-to-detect natural biomarkers in blood samples, Earli's technology *forces* cancer cells, if they exist, to produce non-human molecules they otherwise

would not naturally make. As a result, such synthetic biomarkers are readily detectable and are easily quantified. The same platform can be used to localization and treatment. Other diseases beyond cancer, are potentially also diagnosable and treatable with this novel approach. Earli is financed by some of the best venture capital firms in Silicon Valley and China. We are currently based in the West Coast's prime biotech hub in South San Francisco at Johnson & Johnson's JLABS. More information can be found at [www.earli.com](http://www.earli.com)

#### Who You Are

- You share our same sense of dedication, scientific passion and entrepreneurial spirit.
- You are technically gifted, with great hands on experience.
- You work well in a fast-paced and extremely focused startup environment.
- You are not only smart, but clever and constantly think outside the box.
- You are able to make logical decisions in an instant when there is little time to evaluate.
- You are a natural communicator and relationship builder.
- You stay calm under high pressure and stress.
- You have the ability to multi-task in a serious way, with an extreme attention to detail.
- You become a representative of the core DNA of the company through who you are.

#### Your Primary Responsibilities

The overarching mission of the Delivery Bioengineer is to solve one of the fundamental roadblocks to non-viral gene delivery: the development of novel synthetic materials that can deliver DNA to a broad range of human cells *in vivo* in a safe and efficacious manner. This is a challenging goal and requires a unique individual with an exceptionally strong and broad skillset in Biomaterials and Drug Delivery.

- Be a core contributor to Earli's internal efforts in developing multiple strategies for non-viral DNA delivery.
- Systematically design and use synthetic organic and polymer chemistry to create large, diverse libraries of polymer, dendrimer, and/or lipid materials with precise control over structure, molecular weight distributions, biodegradability, and biocompatibility.
- Perform purification and characterization of these synthetic components by GPC, HPLC, ESI-MS, MALDITOF MS, NMR as necessary.
- Develop strategies to surface-engineer nanoparticles\
- Formulate DNA nanoparticles and characterize complexation efficiency, particle size, surface charge, and ionization potential.
- With other Earli personnel, test the nanoparticles *in vitro* for cellular uptake, intra-cellular localization, and transfection efficiency across many disease-relevant cell types, including cancer cells, normal primary cells, and immune cells such as macrophages; and *in vivo* across a range of relevant mouse models.

#### Your Required Experience, Knowledge and Skills

- PhD Degree in Chemical Engineering, Bioengineering, Materials Science, or a closely related field, with at least 2 years of post-doctoral research experience
- 4-6 years or more of relevant experience in developing non-viral gene delivery materials, as evidenced by a strong publication record in high-impact journals.
- Development of polymeric and/or lipid-based drug delivery systems. A candidate with a strong background in synthetic chemistry is preferred.
- Physical characterization of formulated complexes including charge, size, encapsulation efficiency, stability etc.
- Must have experience with formulation of nucleic acids (either DNA, mRNA, or structured RNA).
- Ability to assess efficacy of formulated complexes in *in vitro* tissue culture models and/or *in vivo* tissues is essential.

- Strong verbal and written communication skills with the ability to present your results succinctly but precisely in team meetings and formal reports
- Managerial experience a plus but not required.

The LinkedIn post can be found here <https://www.linkedin.com/jobs/cap/view/1180098463/>. Candidates also email Dr. David Suhy, Chief Science Officer at Earli, here: [david@earli.com](mailto:david@earli.com).

**Hillsdale College** has an opening for a visiting assistant professor in physical chemistry. This will likely be a multi-year position (starting August 2019), and would be an excellent opportunity for a 2019 PhD grad with an interest in teaching in a liberal arts environment.  
Contact: Matthew Young [myoung@hillsdale.edu](mailto:myoung@hillsdale.edu)

**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 technoeconomic/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.

#### 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/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)

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.

