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AUG. 2  
SEERLEY HALL

THE ABCS OF ASTROBIOCHEMISTRY:

FROM SOLAR SPECTROMETERS  
TO OUR OWN BACKYARD

KEYNOTE SPEAKER:  
DR. JOSHUA SEBREE  
UNI/NASA

COLLEGE OF HUMANITIES,  
ARTS AND SCIENCES  
University of Northern Iowa

2013  
SUMMER  
UNDERGRADUATE  
RESEARCH  
SYMPOSIUM

# A Message from **Dr. Joel Haack**

Dean of the College of Humanities, Arts and Sciences

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There is no substitute for undergraduate research in any undergraduate science major.

In the College of Humanities, Arts and Sciences at the University of Northern Iowa, we encourage undergraduate students to pursue research. Our faculty members are both interested and eager to work with students. In the traditional classroom-based curriculum, there is nothing quite equivalent to these research opportunities. In many classes, students learn the results of scientific disciplines, but have little opportunity to do science themselves. In other classes, instructors have carefully planned assignments to give their students some sense of what it means to do science, to participate in the disciplinary community, but these projects typically have a fixed time frame, often do not begin with questions the students have generated, and may present only limited opportunities to share what is learned with their disciplinary community. Only in a full-scale research opportunity are students able to experience the entire scientific process.

Here at UNI, students experience the entire process of research as it typically occurs—ask a question or formulate a project, apply for support for the funds required to pursue the project, carry out the research, then make a public presentation of the results. I congratulate all those involved with this celebration of the hard work, and of the joy, of doing science.

(Adapted from a column in the *American Journal of Undergraduate Research*, June 2007.)

## Program

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**11 a.m.**

### **Welcome**

Dr. Joel Haack  
Dean, College of Humanities, Arts and Sciences  
Seerley 115

### **Keynote**

“The ABCs of Astrobiochemistry:  
From Solar Spectrometers to Our Own Backyard”  
Dr. Joshua Sebree  
UNI/NASA

**12-1:30 p.m.**

### **Exhibit of Posters**

#### **Lunch**

Seerley Great Reading Room

# Participants and Poster Locations

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1. Allie Simpson and Julie Kang (Biology)  
*The role of KNOX genes during simple and compound leaf development in the genus Ampelopsis (Vitaceae)*
2. Andrew Ridgway with Dr. Mark Myers and Benjamin Hoksch (Dept. of Biology & Tallgrass Prairie Center)  
*Effects of Flooding on the Flora and Fauna of a Reconstructed Tallgrass Prairie*, Project supported by University of Northern Iowa, Iowa Power Fund
3. Katherine Thomas (Biology), Melanie J. Hopkins (GeoZentrum Nordbayern, Universitat Erlangen-Nurnberg), Carl Thurman (Biology)  
*Latitude and Environmental Pressure: Their Impact on Carapace Shape in Three Species of Fiddler Crabs from Different Regions across the Atlantic Ocean*, Project supported by College of Humanities, Arts and Sciences
4. Laura Asprey and Dr. Sarah Boesdorfer (Chemistry & Biochemistry)  
*The Effects of Participation in Undergraduate Science Education Research on a Teacher's Practice*
5. Tori Quist and Dr. Dawn Del Carlo (Chemistry & Biochemistry)  
*The Influence of Life Experiences on Women's Science Career Decision-Making Across Generations*
6. Chelsea Meier and Dr. Dawn Del Carlo (Chemistry & Biochemistry)  
*Use of a New Method for UNI Student Chemistry Demonstration Instruction*

# Participants and Poster Locations

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7. Jacob Rathmacher, Abby Souhrada and Dr. Laura Strauss (Chemistry & Biochemistry)  
*The Synthesis of Intercalated Disulfides*
8. Sean Steinke and Dr. Eric Peterson (Chemistry & Biochemistry)  
*Characterization of Volume Constrained Protein Folding: The Effects of Water, Confinement, and Salts*
9. Heather Wiltse and Dr. Martin Chin (Chemistry & Biochemistry)  
*Investigation of Diruthenium Bipyridine Complexes*
10. Daniel Evans, Allison Wold and Dr. Melisa M. Cherney (Chemistry & Biochemistry)  
*Investigating Redox- and pH-driven Ligand Switches in Met80-to-Cys Variants of Iso-1-cytochrome c*
11. Allison Wold, Daniel Evans and Dr. Melisa M. Cherney (Chemistry & Biochemistry)  
*Attempts to Tune the Ligand Switch in Type II Heme-thiolate Model Proteins Using Second Sphere Ligand Effects*
12. Thomas D. Petersen and Dr. Colin L. Weeks (Chemistry & Biochemistry), Gurusamy Balakrishnan and Thomas G. Spiro (University of Washington Department of Chemistry)  
*Raman Spectroscopic Studies of Crystal Framework Growth*

# Participants and Poster Locations

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13. Cassara J. Higgins and Dr. Colin L. Weeks (Chemistry & Biochemistry)  
*Building a Brick Wall: Creating Metal Organic Frameworks*
14. Erik Duhn and Dr. Sarah Boesdorfer (Chemistry & Biochemistry)  
*Affecting Students' Conceptual Understanding with Common Misconceptions in General Chemistry*
15. Emilie Borde, Tanner Metz, Angela Wrage, Dr. Jeffrey Elbert (Chemistry & Biochemistry)  
*Programmed Drug Delivery: Catalyzed Amination Studies*
16. Tanner Metz, Angela Wrage, Emilie Borde, Dr. Jeffrey Elbert (Chemistry & Biochemistry)  
*Programmed Drug Delivery: Linker Scale Up Studies*
17. Angela Wrage, Emilie Borde, Tanner Metz, Dr. Jeffrey Elbert (Chemistry & Biochemistry)  
*Programmed Drug Delivery: Model Compounds for Hydrolysis Studies*
18. Katie Wilford, Dr. Jihwa Noh and Dr. Karen Sabey (Mathematics)  
*Assessing Understanding of Fraction Multiplication through Problem-Posing and Models*
19. Corbyn Mellinger, Paul M. Shand, Tim Kidd, Kayla Boyle, and Laura Strauss (Physics, Chemistry & Biochemistry)  
*Magnetic Phase Transitions in Intercalated Dichalcogenide Nanostructures*

# Participants and Poster Locations

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20. Virginia McCall and Dr. Syed Kirmani (Mathematics)  
*Mathematical Modeling of Epidemics*
21. Abigail Lee, Bryan Hendrickson, and Julie Kang (Biology)  
*Development of Leaf Shape and Vein Homology in Morning Glory (*Ipomoea*)*
22. Jordyn A. Tobin and Nilda E. Rodríguez (Biology)  
*Host-pathogen interactions between macrophages and the parasitic protozoan *Leishmania chagasi*: What factors influence infection levels?*  
Project supported by Dr. Robert & Brenda Good Undergraduate Research Assistantship (JAT)
23. Victoria Arreola and Dr. C. Elliott Heinzel (Dept. of Earth and Environmental Science) *Exploring Western Sicily's Prehistoric Transition into Agriculture through Geoarchaeology*
24. John Chesley and Dr. C. Elliott Heinzel (Dept. of Earth & Environmental Science)  
*Delineating the Interrelationships between Naturally Occurring Resources and Western Sicily's Prehistoric Settlement Patterns*
25. Kyle Spurgeon and Tim Kidd (Physics)  
*Effects of Impurities on Nanostructures Formation*
26. Eric Clausen, Connor Delaney, Rui He, and Tim Kidd (Physics)  
*Optical Properties of MoS<sub>2</sub> Nanostructures*

## Participants and Poster Locations

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27. Shawn Poellet, Andrew Folken, and Tim Kidd (Physics)  
*Incorporation of Carbon Nanotubes into Nanocellulose Solids*
28. Alex Corker, Shawn Poellet, Andrew Stollenwerk, and Tim Kidd (Physics)  
*Building a Real World Mario Kart*
29. Andrew Folke and Tim Kidd (Physics)  
*Synthesis of Nanocellulose Solids of Varying Density*
30. Zhipeng Ye and Tim Kidd (Physics)  
*Incorporating 3-D First Person View onto a Quadrotor*
31. Ben Castle and Dr. Adrienne Stanley (Mathematics)  
*Elementary Submodels, Trees and Linear Orders*
32. Conor Delaney and Rui He (Physics)  
*Probing Phase Transition and Surface Properties of Topological Insulator Nanostructures by Raman Spectroscopy*
33. Jordyn A. Tobin and Nilda E. Rodríguez (Biology)  
*Host-pathogen interactions between macrophages and the parasitic protozoan *Leishmania chagasi*: What factors influence infection levels?*  
Funding provided by the Dr. Robert & Brenda Good Undergraduate Research Assistantship (JAT) and the Summer Undergraduate Research Program of the University of Northern Iowa College of Humanities Arts and Sciences.

## Participants and Poster Locations

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34. Kyle Dvorak and Mark Sherrard  
*Selection on Physiology in Three Tallgrass Prairie Species, with Contrasting Flowering Times*
35. Paige Leytem and Dr. Laura Jacson (Biology, Tallgrass Prairie Center)  
*Using Seedling Recovery Methods to Determine Causes of Failed Germination in the Seedlings of Four Native Prairie Species*
36. Tasha Hancock (Biology), Mark Jacobson (Mathematics), and Carl Thurman (Biology)  
*Phenotypic Variation: Morphological Differences among Populations of the Fiddler Crab *Uca rapax* from the Western Atlantic Ocean*  
Support provided by a McNair Fellowship and the College of Humanities, Arts and Sciences
37. Ryan Lockard and Dr. Marek Sliwinski (Biology)  
*A Study of TFL1 and LFY as Agents in the Divergent Evolution of *Arabidopsis thaliana* and *Carica papaya**

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