

Nathan G.F. Reaver, E.I.
Engineering School of Sustainable Infrastructure and
the Environment Environmental Engineering Sciences
University of Florida, Gainesville, FL 32601
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Education

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| University of Florida, Gainesville, FL Ph.D. Environmental Engineering Sciences | Expected May 2018 |
| University of Toledo, Toledo, OH M.S. Bioengineering | Aug 2013 |
| University of Toledo, Toledo, OH B.S. Bioengineering Minors in Chemistry and Renewable Energy Graduated <i>Summa Cum Laude</i> | May 2011 |

Appointments

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| Graduate Fellow <i>University of Florida, Gainesville, FL</i> <ul style="list-style-type: none">Member of the St. Johns River Water Management District-University of Florida Springs Protection Initiative – <i>Collaborative Research Initiative on Sustainability and Protection of Springs</i> | Aug 2014-Present |
| Tau Beta Pi Engineering Honor Society Fellow <i>University of Toledo, Toledo, OH</i> <ul style="list-style-type: none">Fellows are charged to advance the interest of the engineering profession. | Aug. 2011 |
| Graduate Teaching and Research Assistant <i>Department of Bioengineering, University of Toledo, Toledo, OH</i> <ul style="list-style-type: none">Responsible for instructing undergraduate laboratory experiences as well as performing active research within the Biomedical Optics Laboratory | May 2011-Aug. 2013 |
| Building Ohio's Sustainable Energy Future Graduate Member <i>University of Toledo, Toledo, OH</i> <ul style="list-style-type: none">Building Ohio's Sustainable Energy Future is a learning community of students and faculty, dedicated to fostering interest in environmental and energy issues. | May 2011- May 2013 |
| NSF GK-12 Fellow <i>University of Toledo Lake Erie Center, Oregon, OH</i> <ul style="list-style-type: none">The NSF Graduate STEM Fellows in K-12 Education (GK-12) Program supports fellowships and training for graduate students in science, technology, engineering, and mathematics (STEM). Through interactions with teachers and students in K-12 schools, graduate fellows improve communication and teaching skills while enriching STEM content and instruction for their K-12 partners. | May 2012-May 2013 |

Work Experience

Undergraduate Researcher, Photovoltaic Laboratory Aug. 2009-May 2011

Department of Physics and Astronomy, University of Toledo, Toledo, OH

PI: Dr. Alvin Compaan

- Characterized a new transparent conducting oxide antimony doped tin oxide, for use in photovoltaics and electronics.

Research Associate Aug. 2008-Dec. 2008

Cornerstone Research Group Inc., Beavercreek, OH

May 2009-Aug. 2009

Supervisor: Dr. Richard Hreha

- Synthesis and purification of space-qualified materials
- Developed light delivery systems for use in light-activated materials.
- Developed a synthesis and purification technique for the production of photo-active compounds.

Research Experience

NSF REU Student May 2008-Aug. 2008

University of Toledo Physics Department, Toledo, OH May 2010-Aug. 2010

PI: Dr. Alvin Compaan

- Researched deposition of thin films on flexible substrates to produce cadmium telluride photovoltaic cells and tested the stability of these cells in long exposure light soaking tests.
- Researched new configurations and back contacts for CdTe solar cells in order to make them more versatile and less expensive.

Graduate Assistant May 2011-Aug. 2013

University of Toledo Department of Bioengineering, Toledo, OH

PI: Dr. Brent Cameron

- Image processing of human eye iris images for a non-invasive blood glucose measurement system based on image distortion due to refractive index changes.
- Developed the basis for a low cost, off the shelf digital camera-based localized surface plasmon resonance sensing system with applications for biosensing.
- Researched molecular imprinted polymers and their sensing applications for the detection of small molecules, specifically caffeine and theophylline.
- Researched potential photodynamic therapy techniques for treatment of chronic sinusitis.

Master's Thesis Research May 2011-Aug. 2013

University of Toledo Department of Bioengineering, Toledo, OH

- Developed and characterized DNA-based aptamers selective for glycosylated forms of hemoglobin to use in a surface plasmon resonance based biosensor.

Building Ohio's Sustainable Energy Future Research Aug. 2010- May 2013

University of Toledo, Toledo, OH

PI: Dr. Geoffrey Martin

- Developed a system to reduce nutrient runoff into river systems from agriculture by utilizing harvestable biological nutrient collectors.

- Constructed an economic model for the harvestable biological nutrient collector system to determine the conditions of economic viability.

Research Interests

My interests lie in the areas of sustainability, systems science/dynamics and analysis, hydrology, water resources, ecosystem restoration and conservation, energy, and agroecology.

Research Skills

Fabrication

operation of high vacuum equipment, thin film material development, Nano fabrication facility/clean room experience, physical vapor deposition, high vacuum evaporation, radio frequency and direct current magnetron sputtering, laser scribing systems, organic and inorganic chemical synthesis and purification

Measurement and Characterization

scanning electron microscopy, fluorescent microscopy, polarimetry, energy dispersive X-ray spectroscopy, X-ray diffraction, solar cell characterization, UV-Vis-IR spectroscopy, spectrophotometry, fluorometry, differential scanning calorimetry, dynamic mechanical analysis, mass spectrometry, raman spectrometry, surface plasmon resonance spectroscopy, YSI automated glucose measurement

Field

SCUBA certified, general outdoor skills and experience, macroinvertebrate sampling and identification, electrofishing, stream characterization, water quality measurements, YSI water algal content

Laboratory

Cellular genetic transformation and cell growth techniques, bacterial culturing, algal culturing, mammalian cell culturing, bioprocessing techniques, protein purification, chromatography, general optics, laser experience, water quality tests, general electronic skill and knowledge, electric circuit design

Software Experience

MathCAD, Matlab, Pspice, Minitab, LabView, SolidWorks, R, XPP/AUTO, AutoCAD

Honors and Awards

Tau Beta Pi Engineering Honor Society

Sigma Pi Sigma Physics Honors society

Phi Kappa Phi Honor Society

University of Toledo Tower Excellence Scholarship

National Engineering Co-op Scholarship

Building Ohio's Sustainable Energy Future Scholarship

Levis Leadership UT Scholarship

Graduation with Summa cum Laude Honors

First person at UT to receive the Renewable Energy Minor

PTI Fund for Innovation & Entrepreneurship Award

NSF GK-12 Excellence in High School Student Mentoring Award 2013

Outstanding UT Physics Student of the Year 2011

Chad Tabory Memorial Award for Outstanding Undergraduate Research in Physics & Astronomy

University of Toledo President's List
University of Toledo Dean's List
Valedictorian, Millersport High School, Class of 2006
2006 American Legion Eagle Scout of the Year for the State of Ohio
2006 VFW Scout of the Year for the State of Ohio, Ranked 5th Nationally

Notable Collegiate Activities

Student representative for the Ohio Governor's 21st Century Energy and Economic Summit

- Selected to represent UT and the Ohio Governor to conference attendees at the summit for discussion of Ohio's future energy policy.

U.S. Department of Energy Clean Energy Student Challenge

- Lead a team selected to represent UT in an energy business plan competition and qualified for the overall Ohio State level of the competition.

EarthFest Organizer

- Earthfest is an annual event at UT that celebrates Earth day.

Levis Leadership UT

- Underwent leadership training, completed service for the community and UT's campus.

University of Toledo Engineering Council Member

- Served on the student leadership board of the College of Engineering.

UT Student Green Fund Graduate Member

- Served on the Student Green Fund Committee, made grant funding decisions on student project proposals. <http://www.utoledo.edu/sustainability/greenfund/>

Publications

Reaver, N.G.F. (2013) Development and Characterization of Aptamers for the use in Surface Plasmon Resonance Sensors for the Detection of Glycated Blood Proteins. (Master's Thesis)

Reaver, N. G. F., Khare, S. V., Imminence of peak in US coal production and overestimation of reserves. *International Journal of Coal Geology* (2014).

Wierwille, A. J. D., **Reaver, N. G. F.**, Khare, S. V., Imminence of peak in world uranium production, overestimation of reserves and low EROEI (submitted 2014)

Selected Abstracts, Conference Proceedings, and Presentations

Reaver, N. G .F.*(2010) A Potential Transparent Conducting Oxide for Thin Film Solar Cells: Antimony Doped Tin Oxide. Posters at the Capitol: Undergraduate Research in Northwest Ohio. Columbus, OH, April 2010.

Reaver, N. G. F.*, Weland, K., Compaan A. D. (2011). Effects of Back Contact Materials on Substrate Configuration CdTe Solar Cells. American Physical Society March Meeting. Dallas, Texas, USA. March 2011.

Reaver, N. G. F.*, Reaver, Z. A., Panek, S., Woodling, K. M., Seedorf, M., Wade, S., Williams, A., Hymore, L., Coffman, K. (2011) Energy Production and Water Quality Improvement by Means of Human-Constructed Wetlands. Posters at the Capitol: Undergraduate Research in Northwest Ohio. Columbus, OH, April 2011.

Ashenfelter, B., **Reaver, N. G. F.** (2012) Building Ohio's Sustainable Energy Future: Using Partnerships in Green Energy and Sustainability to Advance STEM Education. . Posters at the Capitol: Undergraduate Research in Northwest Ohio. Columbus, OH, March 2012.

Reaver, N. G. F.*, Allman, T., Woodling, K. M., Reaver, Z. A., Doer, A., Campana, B., Panek, S., Trivisonno, S., Babcock, O., Nagel, C., Seedorf, M., Beegle, J., Clendenen, S., Williams, A., Coffman, K., Bova, A., Wade, S., Sulin, M. (2012) Energy Production and Water Quality Improvement by Means of Human-Constructed Wetlands. Posters at the Capitol: Undergraduate Research in Northwest Ohio. Columbus, OH, March 2012.

Reaver, N.G.F.*, Zheng, R., Kim, D., Cameron, B.D. (2012) Aptamer Functionalized SPR Surfaces for Selective Blood Protein Monitoring. SciX, the 39th Annual Meeting of FACSS. Kansas City, MO, October 2nd, 2012.

Reaver, N.G.F.*, Beegle, J.R.* , Doerr, A.T* , Reaver, Z.A.* , Clarke, B.W., Woodling, K.M., Clendenen, S.N.* , Potter, E.J., Trivisonno, S.M., Burns, K.A., Marshall, L.E., Niedermeyer, J.A. (2012) Energy Production and Water Quality Improvement by Means of Human-Constructed Harvested Wetlands. 4th International Ecosummit. Columbus, OH, October 2nd, 2012.

Reaver, N.G.F.*, Beegle, J.R., Doerr, A.T, Reaver, Z.A., Clarke, B.W., Woodling, K.M. (2012) Building Ohio's Sustainable Energy Future (BOSEF) and Human-Constructed Harvested Nutrient Collector Model for Energy Production and Water Quality Improvement. Invited talk at NASA Glenn Research Center-Plum Brook Station. Sandusky, OH, October 12th, 2012.

Reaver, N.G.F.*, Beegle, J.R.* , Doerr, A.T* , Reaver, Z.A.* , Clarke, B.W., Woodling, K.M., Clendenen, S.N., Potter, E.J., Trivisonno, S.M., Burns, K.A., Marshall, L.E., Niedermeyer, J.A. (2012) Energy Production, Water Quality Improvement, and Economic Gain for Agriculture by Means of Human-Constructed Harvestable Wetlands. Sustainable U: Perspectives on Sustainability in Higher Education and Beyond in Northwest Ohio. Toledo, OH, November 1st, 2012.

Reaver, N.G.F.*, Bova, A., Beegle, J.R.* , Doerr, A.T* , Reaver, Z.A.* , Clarke, B.W., Woodling, K.M., Nagel, C., Gilchrist, B. (2012) The University of Toledo Student Green Fund: What is it and how did it begin? Sustainable U: Perspectives on Sustainability in Higher Education and Beyond in Northwest Ohio. Toledo, OH, November 1st, 2012.

Reaver, N.G.F.*, Beegle, J.R., Reaver, Z.A., Deitz, J., Woodling, K.M. (2013) Agogy – Clean Water, Clean Energy, Clean Farming. Department of Energy Ohio Clean Energy Challenge 2013. Columbus, OH, January 29th, 2013.

Reaver, N.G.F.*, Zheng, R., Kim, D., Cameron, B.D. (2013) Aptamer-based surface plasmon resonance sensing of glycosylated human blood proteins. SPIE Photonics West 2013. San Francisco, CA, February 3rd, 2013.

Reaver, N.G.F.*, Beegle, J.R., Doerr, A.T, Reaver, Z.A., Clarke, B.W., Woodling, K.M. (2013) Economic Viability of Harvestable Nutrient Filters for Water Quality Improvement and Energy Production. CNREP 2013 Challenges of Natural Resource Economics & Policy. New Orleans, LA, March 25th, 2013.

Reaver, N.G.F.*, Zheng, R., Kim, D.S., Cameron, B.D. (2013) Development of aptamers for surface plasmon resonance sensing of glycosylated human blood proteins. 4th Annual Midwest Graduate Research Symposia. Toledo, Ohio. April 2013.

Hwang, Y., **Reaver, N.G.F.**, Feyzizarnagh, H., Gupta, N., Kim, D.S., Cameron, B.D. (2013) Surface Plasmon Resonance (SPR) Based Sensing for Selective Blood Protein Monitoring Through the Use of Aptamer Technology. The 223rd Electrochemical Society Meeting. Toronto, ON, Canada, May, 2013.

Feyzizarnagh, H., **Reaver, N.G.F.**, Kim, D.S., Cameron, B.D. (2013) Immobilization of protein aptamers on binary SAM for protein sensing applications. The 224th Electrochemical Society Meeting. San Francisco, CA, October, 2013.

*speaker

Teaching Experience

Teaching Assistant and Lab Coordinator for BIOE Bioinstrumentation Lab Aug 2011-Dec 2011
University of Toledo, Toledo, OH

Teaching Assistant for BIOE Computer Applications Jan 2012-May 2012
University of Toledo, Toledo, OH

NSF GK-12 Fellowship Classroom Experience March 2012-May 2013
Clay High School, Oregon, OH

- Assisted high school physical science and biology classes several times each week to enrich the required content and expose students to additional science and engineering topics.
- Networked with the Ohio Department of Natural Resources and US Fish and Wildlife Service to start a bird and bat wildlife impact study of the school's large wind turbine.
- Assisted students in formulating and pursuing small group scientific projects over the course of the school year and then presenting them to the public.

Outreach

Mathematics Tutor through the UT Catharine S. Eberly Center for Women Jan 2010-May 2010
Ella P. Stewart Academy for Girls, Toledo, OH

Building Ohio's Sustainable Energy Future STEM outreach program Aug 2010-May 2013
University of Toledo, Toledo, OH
Bowling Green State University, Bowling Green, OH

*Lourdes University, Sylvania, OH
Cedar Point, Sandusky OH*

- Created and performed public educational demonstrations on energy, sustainability, and physics.

Started the UT Student Green Fund at the University of Toledo

Dec 2011-Aug 2012

University of Toledo, Toledo, OH

- Brought the idea of a Green Fund to UT, obtained student backing for the idea, and obtained approval from the university president and board of trustees.
- A Green Fund is a student funded and student led body that accepts proposals and grants funding for sustainable projects on campus or the greater university community.