

UNIVERSITY OF WYOMING
Energy Science Graduate Stipends and Fellowships
NOVEMBER 1, 2014

2011 Session Laws, Chapter 88, Section 346(d)(ii)(D)

To the Joint Appropriations Committee; Joint Minerals, Business and Economic Development
Committee; and Governor Mead

During its 2011 session, the legislature appropriated \$6,247,930 in Abandoned Mine Lands funds to UW's Office of Academic Affairs for energy science graduate stipends and fellowships. The funds are to be expended over multiple years with no more than \$1 million expended per year.

For FY 2015, approximately \$867,000 in funding is allocated for graduate stipends to support 31 graduate students. The program is designed to support students over a two-year period. There are 13 students in their second year of the program.

We have 18 new students joining the program, with only two projects forfeited due to students committing to other programs or institutions. Although we have four additional students this academic year, UW continues to experience some barriers in attracting students to the program. These include poor recruiting efforts and an increase in competitive stipends offered by other institutions. A third barrier, which effects the entire state, is the University's relative geographic isolation. Graduate assistantships for this program were increased following the approval of FY 2015 salary increases for University employees. This adjustment should help with the issues of competitive stipends offered by other institutions.

The legislation also stipulated that, through Grade Point Averages and Graduate Record Examine (GRE) scores, "only highly qualified candidates are to be awarded energy science graduate stipends or fellowship opportunities." UW addressed this provision by examining the GRE scores for the students under consideration. The GRE scores of the fellowship recipients were *extremely high* with an average score of 319. The talent level attracted through this program continues to be extraordinary.

The energy science GA stipends permit UW to pursue important energy research for the state while raising the stature of graduate education by recruiting outstanding graduate students. Comparable to GA stipends provided in the previous years, the new awards for FY2015 support fundamental research in a wide array of energy topics important to Wyoming. Examples include research in rock and fluid properties in hydrocarbon reservoirs, enhanced oil recovery, coal bed methane production, wind energy simulation, reliability of wind turbine blades, and solar energy. In addition, studies aimed at improving oil and gas field air quality and treating water produced by hydraulic fracturing were also supported.

Table 1 provides a summary of the departments receiving FY15 energy GA awards along with a brief description of the projects. Table 2 lists the ongoing FY14 awards.

Table 1. Energy GA Awards made in AY 2014-15.

College / Department	Topic
Arts & Sciences	
Chemistry	Structural Characterization of the Organic Shell on Quantum Dot Surface
Geology & Geophysics	Quantitative Characterization of Reservoir Continuity in River Laid Deposits
Geology & Geophysics	Fluid-rock interaction between hydraulic fracturing fluids and unconventional shale gas/shale oil reservoirs of Wyoming: Fundamental geochemistry and alternatives for unconventional resource stimulation
Geology & Geophysics	Joint inversion of seismic and electromagnetic data for estimation of rock and fluid properties in hydrocarbon reservoirs
Geology & Geophysics	Prediction ahead of the drill-bit
Geology & Geophysics	The Development and Experimental Verification of a New Simulation Inversion Technology for Improved Surface Characterization
Mathematics	Reliable Iterative Procedures and the Construction of Preconditioners for Solving Linear Algebra Problems as Found in Reservoir Simulations
Mathematics	Consistent Multi-Scale Wind Energy Simulations
Physics & Astronomy	Introducing Electron Spins to Quantum Dot Sensitized Solar Cells
Business	
Economics and Finance	Corporate Governance, Environmental Compliance, and Investor Returns in the Energy Sector

Table 1 (continued)

Engineering & Applied Science	
Atmospheric Science	Determining The Source of Methane and VOC Leakage From Unconventional Oil and Gas Extraction
Chemical & Petroleum Engineering	Multiple-model fluid flow simulation conditioned by geophysical data
Chemical & Petroleum Engineering	Catalytically Converting Wyoming Coal to Methanol
Chemical & Petroleum Engineering	Use of CO ₂ Through Coal Gasification For Producing More Chemicals And Fuels, A Win-Win Strategy For Coal Utilization
Chemical & Petroleum Engineering	Investigation of perovskite type oxide material for use in the oxidative coupling of natural gas to produce value added liquid fuels
Chemical & Petroleum Engineering	A Method of Patterning Wettability In Microfluidic Models to Investigate Low Salinity Waterflooding
Mechanical Engineering	Development of a Physics-Based Methodology for Reliability Prediction of Wind Turbine Blades
Mechanical Engineering	An Experimental Study on in-Situ Carbon Capture for Steam Gasification of Coal and Biomass

Table 2. Energy GA awards made in AY 2013-14. Students are provided funding for two years.

College/Dept.	Topic
Agriculture & Natural Resources	
Ecosystem Sci & Mgmt, MS	Anthropogenic and Environmental Factors Influencing Pronghorn Populations in South-Central, Wyoming
Plant Sciences, MS	Potential of forage kochia to reclaim disturbed areas and areas of low reclamation potential used by gas industries in Wyoming
Plant Sciences, Agronomy, MS	Utilization of Coal Bed Methane (CBM) Water for Irrigation of Biofuel Crops
Arts & Sciences	
Chemistry, PhD	Tunable organic light-harvesting nanostructures
Chemistry, PhD	Solar conversion of water to fuels using photoactive metals
Geology & Geophysics, PhD	In conjunction with: Cretaceous Tight Oil Consortium (K-TOC), 2012-14
Physics & Astronomy, MS - Student receiving assistantship in fall 2013, only.	Development of a numerical solution employing orthogonal polynomial properties
Engineering & Applied Science	
Chemical & Petr Engr, PhD	Enhanced Oil Recovery From The Bakken Shale Formation
Chemical & Petr Engr, MS (quick-start)	Unlocking the Dispersion Mechanism of Petroleum Asphaltenes
Chemical & Petr Engr, PhD	Proton Exchange Membrane Fuel Cell (PEMFC) Catalyst and Assembly Study for Advanced Energy Conversion
Chemical & Petr Engr, PhD	A Microfluidic Model for Visualizing Snap-Off During Spontaneous Imbibition
Chemical & Petr Engr, PhD	Inertial Microfluidic Flow Focusing for Enhanced Biofuel Production
Mechanical Engr, MS	High-Strength Shape-Memory Composites
Mechanical Engr, MS	Investigations of Swirling Jet and Wake Flows for Energy Applications