**ACEP Internship:**

**Design of a Demand Management Center – Hardware**

The Power Systems Integration Program at the Alaska Center for Energy and Power is seeking an intern to work on designing a Demand Management Center (DMC) for the Power Systems Integration Laboratory. The DMC will be built around demand management equipment supplied by Saturn South ([www.saturnsouth.com](http://www.saturnsouth.com)). The successful applicant will integrate this equipment into a design incorporating resistive and inductive loads, data acquisition and control equipment, protection and switching, as well as a suitable enclosure. The DMC will also interface with a Demand Management Simulator (DMS) that scales the physical DMC environment to larger fleets of demand-managed devices.

The successful applicant will meet the following requirements:

- Junior or higher standing in Electrical Engineering, Physics, or a closely related field. Entry-level students with significant, and demonstrated experience in power systems design will be considered.
- Working knowledge of circuit breaker and cable sizing, and selection of other appropriate electrical components for a given power level.
- Basic knowledge of best practices for electrical design as per the National Electric Code.
- Good academic standing (GPA of 3.5 or higher).
- Working knowledge of AutoCAD drafting software, AutoCAD Electrical is preferred.
- Excellent verbal and written communications skills.
- Working knowledge of LaTeX-based typesetting is a plus.
- Must be self-motivated and able to work with minimal supervision.
- Must be able to work well in a team.

**Design and Development of a Demand Management Simulator – Software**

The Power Systems Integration Program at the Alaska Center for Energy and Power is seeking an intern to work on design and development of a Demand Management Simulator (DMS) for control systems and optimization software development in the Power Systems Integration Laboratory. The DMS will simulate a fleet of Saturn South’s ([www.saturnsouth.com](http://www.saturnsouth.com)) demand management devices and their associated network and communications architecture. The DMS will interface with a physical Demand Management Center to affect actual demand changes in a physical grid.

The successful applicant will meet the following requirements:

- Junior or higher standing in Electric Engineering, Computer Science, Physics, or Mathematics, or closely related field. Entry-level students with significant, and demonstrated in software development and modeling will be considered.
- Proficiency in one of the following programming languages: C++ (preferred), Python, or Java.
- Working knowledge of software documentation packages, e.g., Doxygen, or JavaDocs.
- Good academic standing (GPA of 3.5 or higher).
- Excellent verbal and written communication skills.
- Working knowledge of LaTeX-based typesetting is a plus.
- Must be self-motivated and able to work with minimal supervision.
- Must be able to work well in a team.
Energy Analysis Group

Addressing Alaska’s energy issues requires an interdisciplinary approach. At ACEP, we believe it is only with an understanding of both technology and economics that well informed solutions can be crafted. Recently, ACEP has been working to better understand the demand side of energy in Alaskan communities and has worked closely with state agencies to develop a strong dataset that allows for detailed analysis of energy use in Alaska. ACEP is looking for students who are diligent, careful, and have some hard data skills to assist with mining this reach data resource.

- Students perusing their Masters or PhD (Preferred) in Economics, especially someone interested in working on energy demand related topics. Undergrads majoring in engineering for physics is an acceptable alternative provided they have excellent and demonstrated data crunching skills.
- Experience with large datasets, including data cleaning and analysis
- Must have familiarity with MatLab, SAS, or related software

Data Collection and Management

ACEP coordinates data collection and analysis for a number of state-funded renewable and sustainable energy projects, ranging from in-river turbines for energy generation to ground-source and air-source heat pumps to forest sustainability to innovative insulation for heat loss minimization. As part of its activities, ACEP produces a "Lessons Learned" review for each project that includes a review of the overall significance and applications of the technology, the specific project overview, and a critical analysis of the technology's future in Alaska and elsewhere based on project performance. For past projects, these reports have been made into glossy brochures that have received wide circulation and citation in Alaska and beyond. In short, they are great publicity for renewable energy projects in Alaska!

These projects have proved to be great vehicles for student learning and involvement in the past, and ACEP would welcome summer internship interest. Desired skills include:

- Curiosity about renewable energy technologies
- Excellent ability to research general information about a specific technology and to create documents about that technology
- Able to understand basic engineering concepts and practices, especially as they relate to power production in rural Alaska
- Possess strong writing and analytical capabilities
**Alaska Hydrokinetic Energy Research Center**

To facilitate the development of hydrokinetic power in Alaska, ACEP established the Alaska Hydrokinetic Energy Research Center (AHERC). AHERC’s Tanana River Test Site in Nenana (60 miles south of Fairbanks) is used to test hydrokinetic power-generating devices over the summer. Interns are needed to support the work of researchers. If you have any of the following skills, please consider applying:

- Fieldwork experience in a river setting
- Able to drive boats in a complex environment
- Undergraduate fisheries coursework
- Experience with GPS Survey Equipment
- Strong Math Background
- Experience operating sonar devices
- Modeling background, experience with finite element and finite difference methods is preferred

**Public Facility Energy Efficiency Enablement Internship**

The Georgetown University Energy Prize is a competition between communities to spur energy efficiency. The contest will report energy efficiency improvements between Jan. 1, 2015 and Dec. 31, 2016, with a goal of reducing residential and municipal electric use by 12 percent. This internship includes the following tasks:

- Identify all public facilities and infrastructure in the Fairbanks North Star Borough and characterize the types and amounts of energy used in each.
- Working with others, develop a methodology for identifying energy efficiency improvements and estimating the potential energy savings that could be realized across the borough.
- Prepare payback analysis for the energy efficiency improvements identified.
- Familiarity with basic energy efficiency and finance concepts. Microsoft Office. Good verbal communication and inter-personal relationship capabilities. Background in Engineering (mechanical, civil, electrical), Business, Economics, or Architecture is helpful.

**Business of Energy Internship**

Businesses across Alaska have been developing the technical expertise to provide reliable energy to our citizens. Alaska is in a place where it could export its knowledge to other regions of the world that primarily generate electricity using diesel electric generators couples with renewables, and Alaska can also attract more businesses into the state because of its strong history of investing in hybrid systems. In order to help quantify the opportunities, the intern will perform economic, industry, policy, and workforce analysis to better describe the opportunity for “Made-in-Alaska” energy components and/or systems. Tasks will include:

- Designing and conducting surveys for current energy or energy-supporting companies who have Alaska as their base of operation
- Conduct case studies of a small number of businesses to identify why they are successful in Alaska.
- Identify types of potential “Made-in-Alaska” energy businesses that do not exist in Alaska and assess the potential for attracting them to Alaska.
- Graduate level Economics preferred, but will consider applicants with a business development background. Demonstrated analytical and writing skills is required.
ACEP General
In addition to the above, there are several projects in the planning stages that may require the assistance of an intern. ACEP encourages you to submit your resume for consideration in the event these additional opportunities develop into a project. Our future projects may demand students with the following skills, experiences or interests:

- Engineering (electrical, civil, mechanical, etc.)
- Business Management
- Marketing, Communications and Outreach