INDUSTRIAL ASSESSMENT CENTERS

Student and Alumni Newsletter

January 2005

Visit us at www.IACforum.org

Fellow IAC/EADC Students and Alumni

Welcome to the students and alumni of DOE's Industrial Assessment Center Program (formerly known as the EADC, or Energy Analysis and Diagnostic Centers). The current edition of the newsletter focuses on the student experience in the IAC and the application of that experience by alumni who are currently working in the energy industry. As we enter the New Year (2005), we have found that our graduating students and alumni are in high demand as energy prices continue to rise and as energy becomes a key component of our national security. Our student and alumni web site is regularly stocked with exciting job opportunities for IAC graduates, along with the resumes of students and alumni that are entering the job market. I regularly get phone calls and email from alumni with reports of exciting careers in fields including automotive, construction, utilities, energy services and consulting. The experience and exposure gained through your participation in the IAC or EADC places you head and shoulders above the competition for jobs.

In 2005 the IAC will continue to support student activities including the Annual Student Meeting in Washington DC (February 17-18), the website, DOE-IAC student certification, and student travel to professional conferences. Again, I encourage all students and alumni to take advantage of the wonderful opportunities that the program offers. If you have any suggestions or questions, or if you would like to share your student or alumni experiences in our next newsletter, please contact me at martinma@ornl.gov, or 865-574-8688.

Michaela Martin, PE, CEM
IAC Student Activities Coordinator
Oak Ridge National Laboratory

Visit the IAC Student and Alumni Website!

Did you know that you have a powerful resource at your fingertips? The IAC student website is a great place for students and alumni to interact, search for jobs, network with IAC colleagues and provide feedback about the program. The site is available 24 hours, 7 days a week at www.IACforum.org. It features current IAC news as well as information on upcoming conferences and other energy related events. Contact and marketing information for each of the centers is accessible online through the marketing and contact sections. Students and alumni may post their resumes in the careers section. Employers are able to post job opportunities in this section too and there is also a link to the Association of Energy Engineers Online Career Center. The tools section contains links to numerous assessment tools and other useful energy efficiency information. Finally, the feedback section features a connection to the student registry and the exit interview site.

The IAC student website also has a monitored discussion board for both general and technical questions and discussions. These boards are facilitated by Jill Mesonas at Rutgers and are open to a bevy of topics, questions and thoughts. The exchange tab on the left side of the website will take you to the bulletin boards. From there you can search old topics, pose a new idea, or help out a fellow student who may have posted a question or request for information.

Visit the site often to stay up-to-date and in touch. http://www.iacforum.org

2004 IAC Director's Meeting from a Student's Perspective

By Drew McMahan, Lead Student, Oregon State University

In July I had the privilege of representing Oregon State University and the students of the IAC program at the Director's Meeting in San Diego, California. The meeting was held at the Manchester Grand Hyatt hotel.

The meeting began with the expected welcomes and updates. Things became interesting when James Quinn offered a glimpse at the Department of Energy's emerging strategy for its software tools – a suite that integrates the functionality of all the existing best practices tools. IACs will play an important role in the testing and refining of this forthcoming suite.

The essence of the IAC's mission is implemented energy savings. Ellie Najafi of Bradley University has worked hard analyzing the Bradley IAC's implementation data, and presented her conclusions at the meeting. A key point she made is that most importantly, the process should not end with the mailing of the report. The IACs would better serve their clients by following up and working hard to answer any questions they have. We need to learn the reasons clients cite for not implementing recommendations and think of ways to refine our processes to overcome these barriers and continually improve our results.

Combined Heat and Power (CHP) was the focus of the second day. Discussion included identifying good CHP candidates, available software tools, and presentation of CHP related Assessment Recommendations (ARs) published by several IACs. The Department of Energy has established "Regional Application Centers (RACs)" to assist with the implementation of CHP. The hope is that the IACs can function as an effective outreach for the RACs by identifying and referring quality CHP candidates to them. Richard Brent and Solar Turbines continued their generous support of the IAC program by hosting the directors at their San Diego headquarters for a tour of their turbine assembly facility and to hear presentations from their staff.

In summary, it was a very positive experience. Witnessing firsthand how many people are working hard to make this program a success reinvigorated my own desire to contribute. I have every confidence that the IAC program will continue to prosper and have a profound impact on mid-scale manufacturing in the United States.

The Importance of Working with the IAC

Rory Cannaday, University of Texas-Arlington IAC

After working with the University of Texas-Arlington's Industrial Assessment Team for over a year, and then going off into a full time manufacturing job at Vought Aircraft, I would have to say that some of the basic principles you practice during your IAC tenure will help you enormously.

Teamwork

First, the fact that on a regular basis you work in teams of three or more IAC students on assessments means a lot. For instance, one of the projects I worked on at Vought was standardizing an audit procedure and documents for the entire detailed fabrication unit. (This covered over 220,000 sq. ft. with 200+ employees and had 5 main bosses over those areas.) Without my IAC team experience, I would not have been able to pull off creating an audit procedure for Vought that everyone agreed to. Working in teams is the very foundation to any successful project. If you do not take into consideration those who will be affected and get their input, then regardless of how many hours you put into a project, and how great it might be, you will either fail or produce less than a 50% implementation rate. That is why going on assessments and learning to work with all types of engineers,

managers and professors can really benefit you professionally. You learn how to speak their language and how to ask enough questions get to the information you need to do your tasks.

Exposure to Diverse Manufacturing Environments

Working in the IAC also helps to expose you to numerous manufacturing areas. For instance, I have been to factories that produce drilling equipment one week, and then turned around and conducted an assessment for a concrete piping company the next week. Where in the world besides the IAC can mechanical and industrial engineering students get such diverse opportunities?

As an Industrial Engineer working within such a diverse range of manufacturing environments, I always look for a few things when touring companies on IAC assessments. First, what do they do extremely well? Second, what is their main hindrance in not being able to bring the rest of the plant up to the point of success? Is it the management? Is it an attitude? What about workplace design? The point is, before you go on any assessment or do anything, ask yourself why (at least five times!). Try to get to the root of the issue; don't just stay on the surface.

Easing the Transition from Academia to Reality

Another project I worked on with Vought required the consolidation of 220,000 square feet of manufacturing floor space down to 100,000 square feet. If you are an industrial engineer, consider a non-linear problem with constraints such as spacing requirement, flow of work, union issues, staging areas, hook height, cost of moving million dollar machinery, digging pits for parts washers, and on and on down the list. All of these constraints do not allow for an optimum result to occur, so you have to go with "good enough."

How do you do this when throughout your academic engineering experience you were told there is a right answer and a wrong answer? Luckily, you're with the IAC. On assessments, think how many times you thought, "man, if they would do that they could really save some money," but because the payback may be 3+ years or because of the management the idea might not get implemented. In learning how to write assessment reports, you learn how to get to "good enough" so your idea will be implemented. It may not be the best, but that is O.K. because you were able to meet the customer's needs and at the same time achieve a portion of your goal.

So, now let's go back to the project. In order to complete it, I had to work with people from facilities, union, shop floor managers, safety, and different managers. And my final project was "good enough." Sure I thought, "man if they would do this they could achieve a 100% Lean floor space, but that's ok, now they are at 60%." It's a start, everyone was satisfied and therefore the project was a success.

Making the Most of It

Just to finish up, don't take your time at the IAC for granted. Soak it up. If you are only coming for the paycheck, then I'm sorry but you are missing out. On every assessment try to learn one thing about your team members and try to gain as much experience as possible while on the site visits. Even the experience you gain writing assessment reports is to your advantage.

Well, if Michaela would let me I would write more, but to end I would like to thank those who run the IACs all the way from the top to the Lead Students. You make a difference.

Adios,

Rory Cannaday

Industrial Engineer, Detailed Sheet Metal Fabrication

Vought Aircraft Corporation

Ellie's Corner

Woody Allen may have been right when he said: "a lot of success is simply showing up!" Why is that? Lots of people really don't show up at all – and if they do, their ethics, honesty and commitment simply don't. Just being there isn't all there is when it comes to an energy assessment. Understanding the often divergent needs of the different levels involved in any assessment will often lead to an understanding of why there is often a struggle to implement all of the strategies recommended.

The gap between energy saving recommendations and their actual implementation should be taken seriously, and the first step in this process is to explore the causes of this phenomenon. Assessment recommendations are usually multifunctional investments. Therefore, implementing our recommendations will affect factors internally and externally. These factors can address management team involvement, engineering staff input, labor cooperation, financial and accounting consultation, government regulations and requirements, competitors' reactions, market situation, etc. Keeping these in mind, we will need to gain a holistic understanding of the socio-economic interactions within and outside the companies we serve. The first step is to ask: what problem are we going to solve? What unmet need are we going to fulfill? Who is going to care about the problem?

The challenge we face is how to improve the implementation rate of our Assessment Recommendations.

What is involved in an initial partial process of implementation is to develop the willingness of potential actors to adopt energy-efficient behavior. Initially, it makes little sense to presume any particular motive for energy savings. The question of motivation must be answered in a subtly differentiated manner for various groups of actors. It is by means of intensive commitment that initiators have to convince other people (e.g. top managers) of the benefit of the proposed measures. In the process, we often have to adjust our procedure to combinations of motives that may be different than our own. "Discover what your prospect will buy, why they will buy it, and under what conditions they will buy it. Then show it to him."

Recognizing additional motives is important with those groups for whom the subject of "energy efficiency" previously had insufficient appeal. Energy savings can be more efficient where the measures and projects, possible financial and psycho-social incentives, lines of communications, etc., are fine tuned to meet the needs of specific target groups.

We may also have to do some anticipating and pre-empt the concerns before they are even brought up. What may help in this regard is investigating issues such as:

- What makes efficiency important to the particular organization, since it must be on the agenda of top management to get implemented?
- Action has to not only be made possible but also be actually started. From where does the impulse come?
- The outcomes of decisions are strongly influenced by subjective preferences, decision criteria, and decision procedures chosen by the companies.
- What does a profitable recommendation mean in specific context?
- Decisions usually always require the cooperation of internal and external actors. How can internal resistance be overcome?

Although there are technologically feasible and economically viable alternatives for reducing energy consumption in many situations, the actual implementation of measures aimed at increasing energy efficiency is rather small. Even very successful programs such as the Industrial Assessment Centers can benefit from improved implementation rates. Therefore, the issue of addressing implementation potential is becoming more important at every step in the assessment process.

Ellie Najafi
Business Specialist, Bradley University IAC
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Using BestPractices Tools is a GoodPractice

Mitch Olszewski, Oak Ridge National Laboratory

Industrial manufacturing plants are often unaware of cost-effective energy efficiency opportunities that could help them reduce energy losses and improve their energy efficiency. DOE's Industrial Technologies Program (ITP) has developed software tools to help plants identify energy savings opportunities and improve their energy efficiency. These tools are computer-based analytical models that focus on key plant utility systems, including pump, compressed air, steam, and process heat systems. The tools are available online from the ITP BestPractices website located at: www.oit.doe.gov/bestpractices/.

ITP's Software Tools

- Facilitate assessment & analysis
- Build in-plant expertise
- Generate interest in energy savings

These tools, outlined in Figure 1 provide expertise on generic plant utility systems found throughout industry, helping plants identify and quantify energy savings opportunities and guiding users in the steps needed to achieve these savings. These savings tips include improved operation practices, equipment retrofits, and equipment replacements. The tools identify and assess the opportunities for energy and fuel savings without proposing a product, technical solution, or design change. Each tool was developed independently by a partnership with DOE and industry stakeholders. For select tools, training is available to help end-users apply the tool correctly. Training schedules may be found at: www.oit.doe.gov/bestpractices/training/.

Figure 1. BestPractices software tools and descriptions

Tool	Description
Steam System Assessment Tool (SSAT)	Estimates the impacts of key steam system improvements. Generates results detailing the energy, cost, and emissions savings that up to 16 different improvements could achieve.
Steam System Scoping Tool (SSST)	Evaluates a facility's steam system operations and management practices against best practices.
Process Heating Assessment and Survey Tool (PHAST)	Surveys process heating equipment and identifies the most energy-intensive equipment. Performs energy (heat) balances on selected equipment (furnaces) to identify and reduce non-productive energy use. Compares performance of the furnace under various operating conditions, and tests "what-if" scenarios.
AIRMaster+	Assesses compressed air systems, models existing and future system upgrades, and evaluates savings and effectiveness of energy-efficiency measures.
MotorMaster+	Identifies inefficient or oversized facility motors, and computes the energy and demand savings associated with selection of an energy-efficient replacement. Includes motor inventory management, maintenance logging, and a price and performance database.
Pumping System Assessment Tool (PSAT)	Helps user identify energy savings opportunities in pumping systems and quantifies those opportunities in both dollars and electrical energy.
NOx and Energy Assessment Tool (NxEAT)	Assesses and analyzes NOx emissions and applications of energy-efficiency improvements at petroleum refining and chemical plants. Inventories emissions from NOx-generating equipment, and compares various technology applications and efficiency measures that affect overall costs and reduction of NOx. Performs "what-if" analyses to optimize and select the most cost-effective methods for reducing NOx.
Fan System Assessment Tool (FSAT)	Assesses the efficiency of fan-system operations. Identifies savings opportunities, analyzes system data to rate efficiency, calculates energy savings, and identifies fan systems not operating at best capacity.
Combined Heating and Power Tool (CHP Tool)	Identifies opportunities for CHP units. Includes a directory of CHP units in today's market and gives cost and payback estimates.

University of Miami Students Top 90 Assessments

The University of Miami Industrial Assessment Center has been a great learning experience for all of us. We have been involved with the Center's operations since its inception in September 2000. We started with a note pad and with very little experience in conducting industrial assessments. Today, we have 300 electrical data loggers, two unique software packages that we have developed for data analysis and tools like a pressure testing kit, combustion analyzer, velocity meter, infrared camera and the experience that we have acquired over the past four years in data collection and documenting results in energy assessment reports. During this time, we have been involved in over 90 assessments and exposed to manufacturing processes in over 36 different industries.

Although every site assessment is different, there are certain opportunities that are always evaluated. The first is to look at the current utility rate structure and see if there is a more advantageous plan available. The second is to identify consumption occurring during non-operational periods. The data collected with our logging strategy is used to evaluate plant processes. This analysis is largely dependent upon the equipment employed by the plant and obviously varies from site to site. We are now in the process of cutting time needed to download the data and generate reports by using a visual basic interface and USB loggers that have faster download times.

We recently procured pressure and flow measuring equipment for compressed air lines that will be used in conjunction with the DOE's BestPractices software tool Air Master to generate energy savings recommendations. Our familiarity with the BestPractices software tools including Motor Master and the Steam Scoping tool have helped us to increase the adoption of recommendations identified with these tools. Our Assistant Director, Dr. Khaled Abdelrahman is now a DOE Air Master Qualified Specialist.

To be exposed to so many different kinds of industries within such a short time is a once in a lifetime opportunity that very few of us are able to get. We want to thank the Industrial Technologies Program at the U.S. Department of Energy for funding the program which enabled us to gain such an experience. We would also like to thank Dr. Shihab Asfour, our center Director for giving us the opportunity to work for the IAC.

The knowledge gained through our experience with the IAC has prepared us to work to improve the U.S. economy by reducing energy expenditures in industry and reduce production costs for U.S. manufacturers. This effort should help make the U.S. industry more competitive in a global market where a few cents can make the difference between domestic manufacture versus outsourcing decisions.

From left to right: Pinaki Chakraborty (Graduate student), Antonio Reyes (Graduate student), Dr. Shihab Asfour (Center Director) and Mohamed Madbouly (Graduate student)

Spotlight on... Mississippi State University Students and Alumni

An important aspect of the IAC program is the utilization of students to perform energy assessments in the industrial environment and to report formally the findings, recommendations, savings, and costs associated with the assessment. Employers interviewing students who have worked for the MSU IAC find them ranked very high academically, knowledgeable in the energy/utility field, possessing "savvy" computer skills, and capable of writing, delivering, and defending quantitative information in a timely manner. The students who work for the IAC here at MSU have varying backgrounds and interests. They are excellent managers of their time and their work for the IAC is excellent. They find time to study, work, and have fun. A cumulative grade point average of 3.5 is maintained by the students who work for the MSU IAC. A few of our students are highlighted below. For information on our other students, please visit www.IACforum.org.

Adam West (left) joined the IAC in Spring 2004. He is from Tupelo, Mississippi and started at MSU as a freshman in Fall 2001. Adam has been working for his father and uncle (West Body Shop) since he was thirteen. He started by doing auto repairs and car bodywork. Later he learned to lay up fiberglass on boats, weld heavy machinery and water wells, erect buildings, and build trailers. Adam will graduate in Mechanical Engineering in May 2005. His plan after graduation is to find a job in the automotive area. His hobbies and interests are cars, ultimate Frisbee and disc golf. Adam, who is musically talented, leads bands at local churches singing and playing the guitar, violin, and drums.

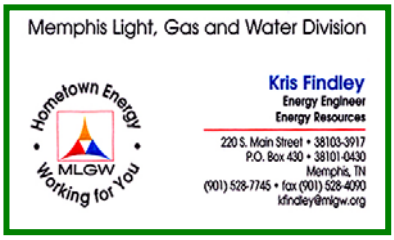
Dean Polk (right) is a senior majoring in Mechanical Engineering and he will graduate in Spring 2005. His plans are to continue his education by attending graduate school at MSU in Mechanical Engineering with an emphasis on sound and vibration. Dean started at MSU as a freshman in Fall 2000. He is from Jackson, Tennessee and was completely home-schooled. Dean worked for three semesters through the cooperative education program for Eaton Aerospace, a manufacturer of hydraulic pumps and motors for commercial and military aircraft. Dean is active in school and church activities. He is a College of Engineering Ambassador, a Cooperative Education Ambassador, a member of ASME, and he teaches Sunday school. Dean likes to run, bike, and play tennis. One of his favorite extra-curricular activities is to support the MSU basketball team as an official member of Rick's Rowdies, a MSU basketball fan club.

Jeremy Childers is the newest Mechanical Engineering undergraduate student working for the IAC. Jeremy, who is from Corinth, Mississippi, transferred from Northeast Mississippi Community College after completing a two-year pre-engineering curriculum. He has been working since he was twelve years old for his father on commercial and residential HVAC systems. At eighteen he learned to operate heavy equipment. When Jeremy came for an orientation session this summer at MSU, his knowledge regarding HVAC and work record became apparent and was so impressive that he was asked if he would be interested in working for the IAC. Normally, students are hired to work for the IAC later in their academic career, but Jeremy is the exception. Jeremy enjoys tinkering on cars, hunting deer and fishing, and he plays the guitar.

Brandi Delee, who is from McComb, Mississippi, started working for the IAC in the spring of 2004. She began at MSU as a freshman in 1999 and will graduate in December with a bachelor's degree in Mechanical Engineering and two minors, one in

English and the other in mathematics. Brandi completed a three-semester cooperative education rotation with McNeil Nutritionals prior to working for the IAC. She is undecided about going to work or going to graduate school. If she decides on graduate school then she plans to concentrate on energy systems. Regardless of the decisions she has to make, Brandi plans to take the spring off and travel to Europe first, then visit with friends in California. Brandi, a vegetarian who enjoys reading and painting with acrylics, is the proud owner of a new energy efficient Mini Cooper.

Kris Findley, MSU IAC's former staff engineer, completed a Masters of Science degree in Mechanical Engineering in December 2003. Kris has recently completed his new employee training at Memphis Light, Gas and Water and he is now officially an energy engineer with MLGW.



IAC Happenings at the University of Illinois at Chicago

During the summer of 2004, **Blaise Steele III**, an undergraduate student in the UIC-IAC, accepted an internship position at ITW Ramset. ITW Ramset assembles power-actuated tools, as well as fuel cell powered tools, for the construction industry. These tools have the capability of driving pins into concrete.

Blaise's job duties during his internship included various engineering tasks using the machining equipment and studying production processes. His projects included:

- Improving the efficiency of their production line for their new fuel cell powered tools that were to start being assembled by the following month
- Improving the efficiency of assembling a new powder-actuated strip tool by performing assembly time studies. The time studies doubled the output of the production line.
- Developing a safety program, including the creation of a safety manual and providing monthly training sessions to the employees

Blaise used the skills and knowledge gained at the Industrial Assessment Center and the classes at the University of Illinois at Chicago to gain new skills and experience during his summer internship at ITW Ramset/Red Head.

Purvi Patel, and undergraduate Industrial Engineering student at the UIC-IAC, took a summer position with United Parcel Service. Working as an intern on the Sunrise shift at UPS' second largest facility in the world, Purvi was assigned the task of forecasting and planning the package loads for the sunrise shift for the remainder of 2004 and all of 2005.

On average, between 500 and 600 employees on the sunrise shift move between 200 and 300 thousand packages daily, rising to 500,000 packages per day over the Christmas holidays. The number of employees must be matched to the projected loads on a daily basis. Plan too few employees and the overtime costs increase with some packages not making their destinations on time, while planning too many employees will result in higher hourly costs.

Purvi's IAC experience helped her at UPS. "The analysis skills learned on the assessments helped me to focus on what I was doing. I learned how to break a problem down, provide a cost analysis and then write a report about what I had found."

"It's a totally different experience as a work environment," said Purvi. "The IE department at UPS faces different issues every day, so it's a new experience every day."

This past July **Matt Swanson**, an undergraduate student at the UIC-IAC, received certification as a Qualified Steam Specialist through Steam Specialist Qualification training given by the DOE. While the

IAC program has been requiring Directors and Assistant Directors to attend specialist training, it is open to everyone in the energy field who wishes to expand their skills base.

"It was the IAC that first introduced me to the wonder of steam back when I joined two years ago," Matt stated. "Before joining the program I was intent on designing roller coasters for a living."

The Steam Specialist Qualification training is 2 ½ days long. Class participants receive 16 hours of formal training in the use of the BestPractices Steam Tools. On the third morning of the training, the Specialist Qualification Training exam is administered.

"Three weeks after attending the training I was notified that I had received the certification," said Matt. The DOE BestPractices website lists only 32 such specialists in the country and Matt is the first undergraduate to achieve this certification.

"The steam qualification training enabled me to become proficient in the use of the SSAT and SSST. With these tools I will be able to identify energy saving measures within a steam system. I encourage anyone who is interested in steam and boilers to attend this training."

Noel Corral, a graduate student at the UIC-IAC, accepted a summer research assistant position at the Gas Technology Institute (GTI) research facility located in Des Plaines, Illinois.

He was employed by the department of Energy Utilization under the direction of project manager Neil Leslie.

GTI's Energy Utilization Center conducts research, development and commercialization of advanced technologies for process heating, steam and power generation, commercial/residential appliances, gasification and air quality. The research that Noel helped conduct at GTI consisted of a detailed investigation of residential building construction practices and innovative building assemblies that are resistant to mold formation and growth. The UIC-IAC's extensive training in HVAC greatly assisted Noel in his research at GTI.

While at GTI, Noel constructed 27 test assemblies and assisted in organizing a test protocol. This position was Noel's first engineering research experience and allowed him to become familiar with a research setting. Furthermore, he studied in depth the effects of different types of building materials and configuration of those materials on a building's resistance to moisture intrusion that can result in mold growth.

IAC Alumni Making a Difference

Jon Cavin – MSU IAC, Class of 2002

Jon Cavin learned a lot from his 5 semesters with the IAC, and he took it with him into the "real world." After graduating from Mississippi State University in 2002 with a degree in Mechanical Engineering, Jon headed to Albemarle Corporation (a manufacturer of specialty chemicals) in South Carolina. He is a mechanical maintenance engineer providing technical support to the process engineers as well as working on cost savings, capital projects, and equipment upgrades; failures; and improvements and analysis.

Jon has garnered some tremendous cost savings for Albemarle by addressing the issues associated with nitrogen consumption. Through leak survey analysis and repair as well as education programs to raise the awareness of nitrogen costs, Jon and his team were able to save over $250,000 last year. Along with the reduction in nitrogen consumption is a focus on steam and compressed air conservation that can be expected to garner even more cost savings in the years to come.

Another project that Jon is working on is a planning and scheduling program to increase maintenance productivity. The goal is to improve the planning and organization of maintenance work in order to minimizing idle time or unplanned jobs and to maximize efficiency. Jon's efforts have already made a drastic positive impact on the size of the backlog list, moving from a backlog of several months in 2003 to a current backlog list of around two weeks.

Whether it is reduced nitrogen consumption, compressed air conservation or improved maintenance schedules, the common denominator to success is the experience and knowledge gained at the IAC. IAC assessments teach students a broad range of skills regarding cost savings, energy efficiency, and productivity-improving techniques. "These skills were invaluable" says Jon on how his IAC experience allowed him to hit the ground running in his career. A career, he says, that was jump-started by an IAC experience that gave him an edge with prospective employers who took note of his valuable exposure to industry and equipment as well as the recommended cost savings assessments listed on his resume. As Jon has noted, "Companies are constantly looking for ways to cut costs and streamline processes, especially under the recent economic conditions. The experience from IAC work teaches engineers to analyze processes and equipment in order to do just that, and employers definitely take note of it."

Ben Erpelding and Jason Knight – SDSU IAC, Classes of 2002 and 2003

IAC Alumni Ben Erpelding P.E., C.E.M. (SDSU) and Jason Knight (SDSU) have been making a difference with the San Diego Regional Energy Office (SDREO). Ben, a Senior Energy Engineer, and Jason, who has recently joined the team as an Energy Engineer, conduct assessments, organize energy education workshops and tackle many other projects for SDREO.

Through his comprehensive energy assessments at Balboa Park (with over 25 buildings and 750,000 sq ft of museum and office space), Ben has quantified potential energy savings of 3.6 million kWh/yr, 402 kW of demand reduction and 57,000 therms/yr of natural gas. Jason, who has only been with SDREO a few months, has already completed 5 audits on Balboa Park recreation facilities, offices and meeting halls.

Recently, Jason performed an audit of a large hospital where a total of 1.8 million kWh of energy savings opportunities were identified. Some of the energy savings opportunities included an all-variable-speed central plant using the Hartman LOOP control strategy, a booster chiller retrofit with an oil-less centrifugal compressor, variable frequency drives on boiler combustion blowers, heating hot water pumps, lighting upgrades and a 60 kW rooftop PV system. Now, "we have our sights set on several other hospitals and healthcare facilities in our area," says Jason.

The energy assessments that Ben and Jason perform are part of the SDREO Technical Assistance Program (TAP). The objective of TAP is to provide technical assistance, free audits and feasibility studies for public agencies, healthcare facilities, manufacturing plants and commercial businesses in the San Diego region. TAP is planning 150 energy audits over the next two years to keep Jason and Ben busy.

Currently, Ben is working on an investment grade energy audit of the world-famous San Diego Zoo. The project should be completed in a few weeks, and the guys promise to keep us posted on the results. Jason has also been busy assisting on the "Rebuild a Greener San Diego" project. This is an incentive program designed to help the victims of the San Diego wildfire that swept through the area last October. Through this program, SDREO offers rebates to help people rebuild a home that is 20% more energy efficient than California regulations stipulate. Solar energy is also encouraged with a $4/Watt rebate for homes built with a photovoltaic system.

Not only does this workload mean that Jason and Ben are busy, it also means that these two energy engineers are really making a positive impact on energy efficiency in California. The work these IAC alums do on assessments, education and other programs at SDREO is saving millions of kWh per year for the San Diego area. For more information on the SDREO, visit their website at www.sdenergy.org.

IAC News Briefs From Current Schools Across the U.S.

ARIZONA STATE UNIV. (Dr. Patrick Phelan) Arizona State has 10 students registered and active this year. Recently the campus was in the spotlight as it hosted one of the presidential debates.

BRADLEY UNIV. (Dr. Paul Mehta) Bradley had 3 students meet the qualifications for certification in October. This past July, Ellie Najafi gave a presentation at the annual IAC Director's Meeting in San Diego. The topic was implementation rate analysis and corrective actions.

COLORADO STATE UNIV. (Scott Johnson) Scott Johnson was appointed the new CSU IAC lead student in August 2004.

We are continuing to expand our geographic coverage by visiting a new state. Three assessments were conducted in the western part of North Dakota. Also, we conducted three assessments in New Mexico. This year we focused on food producers, including turkey feed, hot dogs, donuts, eggs, and animal feed. We visited a few unique plants such as an airplane manufacturer that used a new technology to connect the panels of the fuselage. Also, we toured a facility that was currently using some advanced energy saving methods including a boiler stack heat exchanger, VFD air compressor, and a two-level dimmer switch on metal halide in a warehouse freezer.

The Assistant Director and three undergraduate students were invited to tour a facility that has created a new energy saving product. These new products called Airius Thermal Equalizers are small, low-powered destratification fans that are used to equalize the ceiling and floor temperatures.

GEORGIA INSTITUTE OF TECHNOLOGY (Dr. Sam Shelton) Will Randall attended the 2004 Combined Heat and Power Conference in Washington D.C. this past summer. You can read an article about his experience on the IAC Student Forum website in the news section at www.iacforum.org. Georgia Tech also had two students qualify for IAC certificates in 2004.

IOWA STATE UNIV. (Alex Kisslinger) Dr. Frank Peters from the Industrial and Manufacturing Systems Engineering Department of Iowa State has recently joined our center in place of Dr. Daniel Bullen. Dr. Peters brings experience on manufacturing processes and systems, particularly metal castings. Som Shrestha has joined the center in August as a new graduate student in mechanical engineering. Som has experience in HVAC system design and equipment selection for power houses in power plants.

The center has put some effort into improving our knowledge and ability with the DOE-sponsored software for industrial energy systems. Dr. Gregory Maxwell is now a certified AIRMaster+ specialist and Dr. Ron Nelson a Steam Qualified Specialist.

The IAC at Iowa State continues to provide all students with thorough training in areas such as safety, lighting technology, steam, compressed air, and productivity improvements.

LEHIGH UNIV. (Dr. Sudhakar Neti) Lehigh's Chad Kettering has completed 9 assessments and received an IAC certificate in November.

LOYOLA MARYMOUNT UNIV. (Dr. Bohdan W. Oppenheim) Esteban (Steve) Vasquez, our former Lead Student, took an internship with Alcoa Fasteners in Torrance, CA, this past summer. He intended to return to us at the start of the Fall Semester, but on the last day of his internship, Alcoa offered him a full time job. He is now an Alcoa Business Systems Coordinator, working to train employees and consult management in lean manufacturing. Steve has completed 51 assessments during his time with the IAC.

MISSISSIPPI STATE UNIV. (Chris Emplaincourt) The IAC at Mississippi State University has completed a busy 2003/2004 year. Through additional funding we were able to conduct an assessment for a chemical facility that vents 1000 cubic meters/hour of pure hydrogen into the atmosphere. The students had the opportunity to explore several alternatives for the wasted hydrogen such as purchasing a hydrogen fuel cell, establishing a hydrogen research park in Mississippi, and selling the hydrogen to a natural gas supplier. Additionally, ORNL funded a project through the Federal Energy Management Program for us to conduct an energy assessment for a federal IRS facility in Memphis, Tennessee. One of the deliverables for the project was to model the facility's energy usage using Trane's Trace 700 building simulation software. Ken York, the staff engineer for our center, took the lead for this assessment and he has spent many hours learning the software and has successfully modeled the facility's energy usage.

NORTH CAROLINA STATE UNIV. IAC Students Nathan Block (23 assessments) and Joshua Pope (9 assessments) received IAC certificates this past summer.

OKLAHOMA STATE UNIV. (Scott Frazier) Our IAC has been working to help each client save energy (and money) as well as educate our students in the practice of energy assessment, efficiency, and productivity to energy resources. We are bolstering our analytical abilities in order to enhance energy savings through advanced process monitoring and energy management with the goal of contributing to productivity increases, i.e., P3 productivity as a result of less energy per unit of production. At the same time, we are stretching the boundaries of knowledge in these practices by sponsoring five doctoral dissertations related to energy management. We think that this combination of practice and research is on track to help shape the energy management field to deal with the ever-changing energy situation in the U.S. (and help keep jobs in Oklahoma and the Nation).

OREGON STATE UNIV. (Drew McMahan) The Oregon State University IAC will be working hard this year to fill the shoes of several high quality students who recently graduated and joined the ranks of professional energy engineers. One now works for a local utility and another for a compressed air consulting firm. We are working on developing a more streamlined process for training new students which we are confident will fuel our mission of improving report quality, and produce yet another generation of excellent IAC veterans.

SYRACUSE UNIV. (David Britt) Syracuse has developed an IAC Operations Manual for their center with sections covering all facets of IAC activities and actions. The equipment presentation section is complete with photos and commentary.

SAN DIEGO STATE UNIV. (Ryan Thordson) Dr. Beyene, IAC director, attended an energy conference in Norway concerning possible energy sources in Africa.

Several IAC students are performing research for waste heat recovery of internal combustion engines to power absorption chiller systems. An SDSU IAC graduate student is currently doing research on energy parks using an energy analysis and past IAC assessment data. Another graduate student is working on our CHP software (CogenPro) to incorporate absorption chillers into its functionality.

SAN FRANCISCO STATE UNIV. (Amit Kanungo) This year is a moment of ecstasy for the San Francisco State IAC. Our recommendations are weighted high in the manufacturing industries which in turn has enhanced the rate of implementation. We have also stretched our scope of operation; recently we made a successful energy audit in the state of Nevada. We have also made 6 to 7 audit presentations in some facilities, which enhanced our credibility in the manufacturing sectors. I believe presenting the audit reports in facilities is going to help to have even better implementation in the coming year.

TEXAS A & M UNIV. (Joseph Freeman) The Texas A&M IAC has completed 3 visits for the fall semester, and is planning to complete a total of 25 for this year. We welcomed five new students this semester, giving us a total of twelve students from the areas of mechanical, chemical, civil, and industrial engineering. On September 20 and 21st, we were represented by Zac Rosenbaum at the 5th Annual CHP Roadmapping Workshop in Austin, Texas. Zac said it was a great learning experience and a good opportunity to see how policy affects CHP projects.

WEST VIRGINIA UNIV. (Deepak Gupta) Congratulations go out to Dr. Gopala on earning his Compressed Air Specialist certificate and to Tafazzul Khan for his CEM certificate.

Chandra Gopalakrishnan accepted the position of Associate Project Manager at Vermont Energy, Burlington, VT. Within two months of his professional career, he was promoted to Project Manager. This reflects the level of training and experience a student has at IAC, WVU. Congratulations to Chandra for his achievements.

Tafazzul Khan recently accepted the position of Energy Manager at Sieben Energy Associates, Chicago, IL. Congratulations to Khan for his new career.

Dr. Gopala and three other students participated in training in compressed air systems at the Dayton-IAC in an effort to share the knowledge with another IAC team. Thanks to Dr. Kissock and the students at Dayton University for their hospitality. Dr. Gopala presented his invaluable experience from his compressed air training for IAC students and faculty at WVU.

UNIV. OF DAYTON (Kevin Carpenter) The University of Dayton IAC congratulates last year's graduates Chris Schmitt, John Seryak, and Canisius Rutikanga, whose remarkable legacy is now being carried on by the current UD-IAC team. In addition to IAC work, current team members are now pursuing projects to reduce energy consumption on UD's campus.

UNIV. OF FLORIDA (Christian Cardenas) One of our targets for this year (and afterwards) is the improvement of the quality of our reports to the clients we serve. Accordingly, and among a number of planned improvements, the University of Florida Industrial Assessment Center very recently purchased a new laser color printer, and a flue gas analyzer. The latter will allow us to perform a better analysis of saving opportunities, while the printer will naturally enhance the quality of our reports due to the natural color display

of photos, plots and graphs that we will include, making it more attractive to the reader. Our students, under the lead of Dr. Diane Schaub (UF-IAC Director), have already started their training to accomplish these goals.

UNIV. OF ILLINOIS – CHICAGO (Dr. William M. Worek) Grad student Phillip Valenzuela has completed 25 assessments during his service to the IAC.

UNIV. OF LOUISIANA AT LAFAYETTE (Dr. Ted Kozman) Louisiana Lafayette had two students, Puneet Bhatia and Al Meliala, complete the requirements needed to receive IAC certificates in October.

UNIV. OF MASSACHUSETTS (Dr. Lawrence L. Ambs) IAC Student Mark Gerrish attended the 2004 CHP Road mapping and WEEC Meetings in Texas in September.

UNIV. OF MIAMI (Shihab Asfour) We are currently starting up our assessments for FY2005. Two students joined our team in the Spring of 2004 and two more joined in the Fall of 2004 bringing the total team strength to eight students. The multidisciplinary Miami IAC team now includes students with undergraduate degrees in Mechanical Engineering (2 students), Electrical Engineering (2 students), Systems Analysis (1 student), Environmental Science (1 student), Biomedical Engineering (1 student) and Architecture (1 student) all currently pursuing Masters or Ph.D. degrees in Industrial Engineering.

Dr. Khaled Abdelrahman, our Center Assistant Director, has been recently certified as a U.S. DOE Air Master Specialist.

We now have 300 electrical data loggers including 90 new USB loggers that have faster download times. A visual basic interface is currently being developed that will allow any student to download and generate graphs and charts presenting the logged electrical data. A pressure testing kit manufactured by Parker systems (Service Master 450) now gives us the ability to collect pressure, flow and temperature data for compressed air systems. We now use an ultrasonic leak detector (Ultra Probe 9000 manufactured by UE Systems) to conduct air leak surveys and accurately quantify compressed air leaks for our clients. The results are verified with 1 second electrical data logging of the compressor during non-working hours of the plant to quantify percentage loading of the compressors that feed the leaks.

UNIV. OF TEXAS – ARLINGTON (Dr. Kendall Harris) Buddy Cochran represented the University of Texas Arlington at the WEEC Meeting in September. Buddy has been with the IAC since 2001.

UNIVERSITY OF UTAH (Mike Chambers) Greetings from the University of Utah IAC! Hope all is going well for you! Things have never been better for us. We have a great group of students this year, and we recently hired a new assistant director who is helping us step up our performance to the next level. We had some amazing assessments this summer—we saw everything from diapers to jet engines. It is amazing to experience such a wide variety of processes and manufacturing techniques, all while helping each company keep its business here in Utah by improving its bottom line.

We're looking forward to meeting everyone again at the lead student meeting! Until then, take care and we'll see you later.

UNIV. OF MICHIGAN (Arvind Atreya) Won-Chan Park and Sung-Joon Hwang have met the requirements and requested certificates in October.

UNIV. OF WISCONSIN – MILWAUKEE (Dr. Umesh Saxena) Farouq Al-Hourani has graduated with a Ph.d. degree and is teaching at Morehead State in Kentucky. Dan Ristic, a new graduate student, has recently joined the IAC.

IAC Program Contact Information

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Calendar

- The **IAC Lead Student's Meeting** will be held at L'Enfant Plaza Hotel in Washington, DC, February 16-18, 2005. Travel arrangements for students will be handled through ORNL. Alumni who are interested in attending should contact Michaela Martin at martinma@ornl.gov.

- **DOE's BestPractices** program regularly offers training courses around the U.S. on popular software for compressed air, steam, process heat, motors, and pumping systems. For a complete listing of sessions and locations, please visit : http://www.oit.doe.gov/bestpractices/training/textCalendar.shtml.

- **ASHRAE Winter Meeting** February 5-9, 2005 Orlando Florida. http://www.ashrae.org
- **USCHPA Annual Policy Summit**, May 3-5, 2005, Washington, DC, http://www.uschpa.org
- **Institute for Industrial Engineers Annual Meeting**, May 14-18, 2005, Atlanta, GA, http://www.iieannual.org
- **AEE World Energy Engineering Congress**, September 14-16, 2005, Austin, TX, http://www.energycongress.com
- **ACEEE Summer Study in Industry** – July 19-22, 2005, West Point, NY, https://www.aceee.org, (co-scheduled with the IAC Directors Meeting)

Center Locations

For details, please visit the central IAC website located at Rutgers University, www.iac.rutgers.edu. This website also hosts the popular **IAC database** which contains data for over 11,000 assessments conducted by the IAC since the early 1980's.