Oak Ridge National Laboratory

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

IAC Student Activities Overview

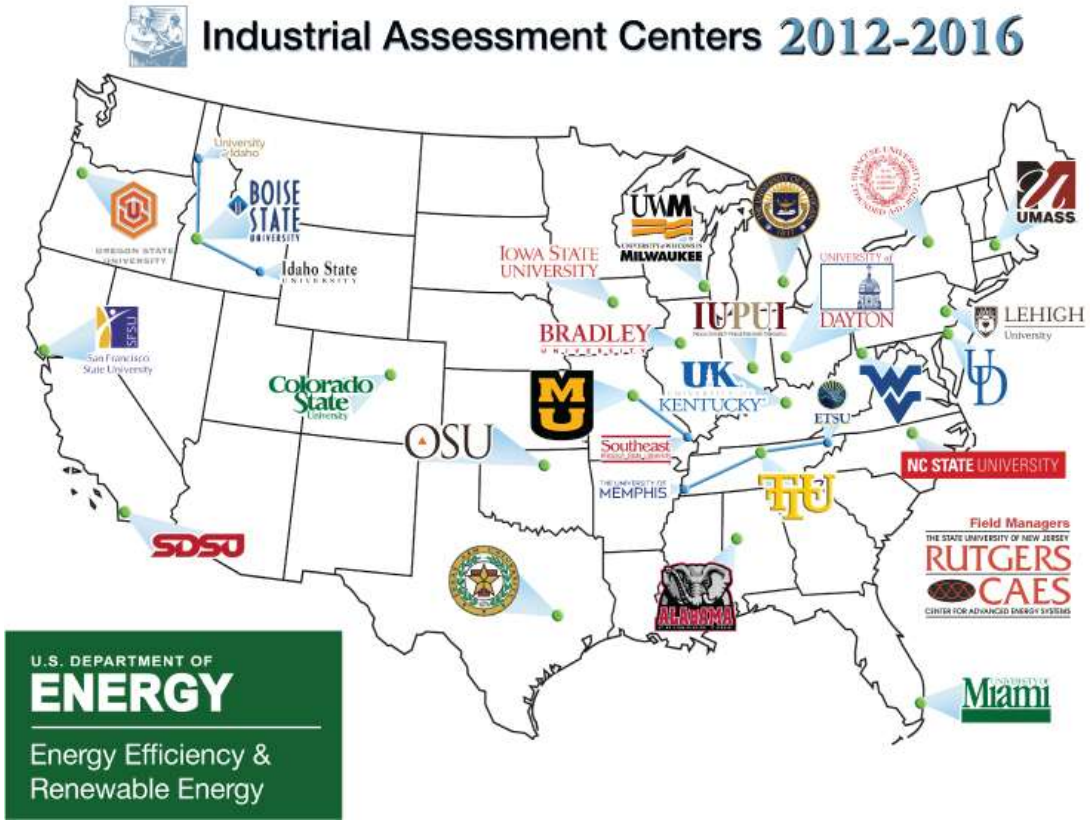
2012 Lead Student Meeting

November 1, 2011

Thomas Wenning
R&D Staff
Residential, Commercial, and Industrial Energy Efficiency
Oak Ridge National Laboratory

Overview

- IAC Metrics & Student Info
- Other Activities
- Student Certificates
- IAC Forum website
- Student Registry
- Program Highlights
- Upcoming Events
- Help!



Student Participation Overview

Year	Participating Students	Students Completing Training	DOE IAC Certificates Issued
FY 2008	290	93	61
FY 2009	334	108	49
FY 2010	356	106	48
FY 2011	377	152	95
FY 2012	441	177	99

Source: www.iacforum.org as of October 30, 2012

IAC Alumni are the Nation's Premier Talent in Industrial Energy Efficiency: **Part of the New Green Work Force**

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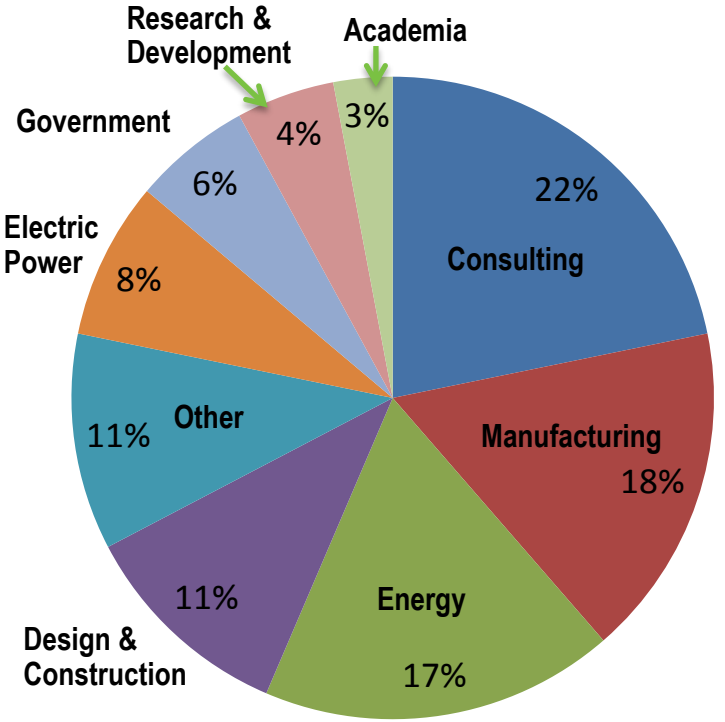
- ~3,020 students trained
- On average, 50% - 60% pursue energy-related careers upon graduation
- 150 – 180 students departing each year
- Engineering fields including Mechanical, Industrial, Electrical; some Business school participants, also
- Student status: Undergraduates – 75%, Graduates – 25%
- Average time spent in IAC: 18 months
- Average number of Assessment: 17



Other Past-Year Activities

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Alumni, Director and Company Case Studies

- Finished three case studies
  - –Dr. Warren Heffington, IAC Director, Texas A&M University
  - –Dr. Bhaskaran Gopalakrishnan, IAC Director, West Virginia University
  - –Schneider Electric
- Located on IAC Forum website
- Website Redevelopment
  - –Updated Appearance
  - –New Content
- **We Need More!!**
- **Call for 2013 Student and Alumni Newsletter articles is coming up!**

ENERGY | Energy Efficiency & Renewable Energy — ADVANCED MANUFACTURING PROGRAM

Schneider Electric Director Initiates Strategy to Recruit IAC Graduates

Carl Castellow realized that his industrial consulting team at Schneider Electric could benefit from adding staff members with Industrial Assessment Center (IAC) experience. Working together with colleagues and the company's recruiting center, they initiated a successful recruitment strategy

The IAC Adv

ENERGY | Energy Efficiency & Renewable Energy — INDUSTRIAL TECHNOLOGIES PROGRAM

Dr. Warren M. Heffington, Director, Texas A&M University Industrial Assessment Center

yt, after 25 years of
nector of the Texas A&M
ument Center (IAC),
icts on his time at the
s and opportunities that
ogram achieve so much

founding director of the
. The U.S. Department
Technologies Program's
l IAC program in 1986,
y was one of four univer-
to establish new centers
the DOE-sponsored
lighbs small- and mid-
with no-cost energy
now, under a great deal of
l encourage continued and
lustrial companies they

IAC supports industrial
ile radius of its campus in
manufacturing sector in
y than that sector in any
the nation's total), giving
e opportunity to help the
small-and medium-sized
ctitive in a global marke-
n, Texas A&M's IAC has
ng experience in energy
nt techniques for students
e has taught over 250
apply energy-conserva-
facturing plants.

nas A&M University
m DOE and other
ded by alumni-hiring
-notch students, and

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Dr. Bhaskaran Gopalakrishnan Extends the Reach of the West Virginia University Industrial Assessment Center

As Director of the West Virginia University (WVU) Industrial Assessment Center (IAC), Dr. Bhaskaran Gopalakrishnan ("Gopala") has a clear goal—broadening the reach and impact of the program.

Discussing energy audit results — Dr. Bhaskaran Gopalakrishnan (left) and Dr. Ed Crowe (right, Engineering Scientist at West Virginia University) discuss some of the findings of an energy audit of a small business in Fairmont

WVU. Photo by Brian Persinger

Background

Gopala is a highly skilled leader with a Bachelor's Degree in Production Engineering from the University of Madras in India; a Master's Degree in Operations Research from the Southern Methodist University in Dallas, Texas; and a Ph.D. in Industrial Engineering and Operations Research from Virginia Polytechnic Institute and State University (Virginia Tech) in Blacksburg, Virginia. He is also a Certified Energy Manager; a Registered Professional Engineer in West Virginia; and a U.S. Department of Energy (DOE) Qualified Specialist in the areas of compressed air, process heating, fans, and steam systems. While noteworthy, these academic accomplishments only begin to depict the depth of Gopala's experience and skill as a professor. Nevertheless, these attributes have enabled him to lead a highly successful IAC that has an impact far beyond its founding mission.

Career Highlights

In August 1988, Gopala joined WVU as a professor in the Department of Industrial and Management Systems Engineering (IMSE), where he benefited from the mentorship of department chair Dr. Ralph Plummer. In 1992, Dr. Plummer and Gopala successfully initiated a center with the purpose of teaching students about energy diagnostics and analysis. This would later became known as the Industrial Assessment Center. In 2005, Gopala assumed the directorship of the school's IAC, which he has since managed with the help of assistant director Dr. Wafik Iskander.

Gopala utilizes his impressive background in energy efficiency and management when teaching his IAC students. As a DOE Qualified Specialist, he has extensive experience performing Energy Savings Assessments (ESAs). ESAs are conducted at large manufacturing facilities with significant operations—often global in scope—that experience high energy consumption. Gopala began participating in these assessments in 2007 and, since then, has conducted more than 40 ESAs. Based on that experience, Gopala recognized an opportunity to combine traditional ESA strategies with the strongest elements of IAC assessments, including the incorporation of an end of project report. In 2008, he initiated the development of such a hybrid approach, which takes two days and is most appropriate for large facilities. Thus far, his team has conducted hybrid ESA-IAC assessments at two large plants—a copper melting facility and a steel galvanizing sheet facility. During the assessments, his students had the chance to follow ESA protocols and then draft an IAC report. It was a unique experience for the students to conduct an assessment at such a large facility, which demonstrated the importance of adjusting a process based on the client's needs.

In addition to his expertise with ESAs, Gopala has also exhibited proficiency with the Superior Energy Performance (SEP) initiative and the new International Organization

continued >

For more than 30 years, the U.S. Department of Energy-sponsored IAC program has trained and educated college engineering students in manufacturing efficiency, helping them become the next generation of industrial energy-efficiency experts. At 24 university-based centers across the nation, IAC faculty and staff lead students in performing energy assessments at a wide range of manufacturing facilities in their area, helping companies reduce energy waste, save money, and become more economically competitive. Students in the program also receive the opportunity to interact with plant management, prepare executive level briefings and work specific reports, and facilitate continuous improvement in energy management at participating facilities.

For more information, visit the Industrial Assessment Centers website.

earned accolades from graduates of the program for the practical knowledge and hands-on experience they gained. The Texas A&M University IAC was the first recipient of the Center of Excellence Award in 2002, which is given annually to an outstanding IAC that has exceeded program expectations. This success is a direct result of the capable leadership of Dr. Heffington and of the work of the many talented "Fightin' Texas Aggie" and Prairie View A&M University students who have participated in the program.

Website Revamp

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- Jobs/Resume boards
- Calendar
- Discussion forum (LinkedIn)
- Metrics

Student Certificates

- On-line requests are processed through the certificates link on www.iacforum.org
- **Students and alumni must be in the IAC registry to receive certificates**
- Deadlines occur 3 times per year:
  - October 1, March 1, and July 1
- Certificate process
  - Student initiates request online,
  - Director/AD receives email notification with link
  - He/she completes the request online
  - Certificates arrive
- Certificates are mailed to the Directors within 30 days of deadline


Certificate of Participation
presented to
Name
For the completion of requirements mandated by the
U.S. Department of Energy's
Industrial Assessment Center Program at
Texas A & M University
August 2001 to December 2003
IAC Service Dates
Undergraduate
Academic Status During Service
17
Number of Assessments Conducted
Dr. Warren Heffington
IAC Director, Texas A&M University
David K. Garman
Assistant Secretary
Energy Efficiency and Renewable Energy
U.S. Department of Energy

Student Certificates – New Criteria

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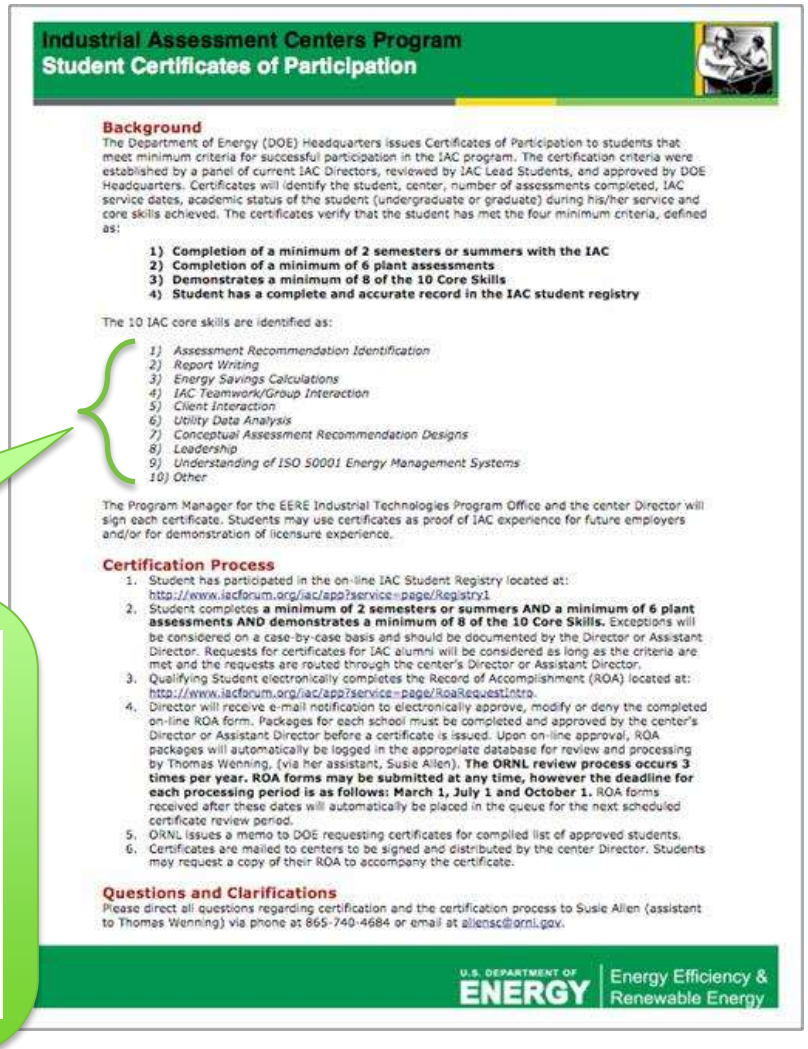
Qualification criteria for students and alumni

- Minimum of 2 semesters or summers
- Minimum of 6 assessments conducted
- Demonstrates **8 of 10** core IAC skills (AR identification, report writing, savings calcs, teamwork, client interaction, utility data analysis, conceptual AR designs, leadership, **energy management,** others)

1) *Assessment Recommendation Identification*
2) *Report Writing*
3) *Energy Savings Calculations*
4) *IAC Teamwork/Group Interaction*
5) *Client Interaction*
6) *Utility Data Analysis*
7) *Conceptual Assessment Recommendation Designs*
8) *Leadership*
9) *Understanding of ISO 50001 Energy Management Systems*
10) *Other*



Industrial Assessment Centers Program
Student Certificates of Participation

Background

The Department of Energy (DOE) Headquarters issues Certificates of Participation to students that meet minimum criteria for successful participation in the IAC program. The certification criteria were established by a panel of current IAC Directors, reviewed by IAC Lead Students, and approved by DOE Headquarters. Certificates will identify the student, center, number of assessments completed, IAC service dates, academic status of the student (undergraduate or graduate) during his/her service and core skills achieved. The certificates verify that the student has met the four minimum criteria, defined as:

1) **Completion of a minimum of 2 semesters or summers with the IAC**
2) **Completion of a minimum of 6 plant assessments**
3) **Demonstrates a minimum of 8 of the 10 Core Skills**
4) **Student has a complete and accurate record in the IAC student registry**

The 10 IAC core skills are identified as:

1) *Assessment Recommendation Identification*
2) *Report Writing*
3) *Energy Savings Calculations*
4) *IAC Teamwork/Group Interaction*
5) *Client Interaction*
6) *Utility Data Analysis*
7) *Conceptual Assessment Recommendation Designs*
8) *Leadership*
9) *Understanding of ISO 50001 Energy Management Systems*
10) *Other*

The Program Manager for the EERE Industrial Technologies Program Office and the center Director will sign each certificate. Students may use certificates as proof of IAC experience for future employers and/or for demonstration of licensure experience.

Certification Process

1. Student has participated in the on-line IAC Student Registry located at: http://www.iacforum.org/iac/app?service=page/Registry1
2. Student completes **a minimum of 2 semesters or summers AND a minimum of 6 plant assessments AND demonstrates a minimum of 8 of the 10 Core Skills.** Exceptions will be considered on a case-by-case basis and should be documented by the Director or Assistant Director. Requests for certificates for IAC alumni will be considered as long as the criteria are met and the requests are routed through the center's Director or Assistant Director.
3. Qualifying Student electronically completes the Record of Accomplishment (ROA) located at: http://www.iacforum.org/iac/app?service=page/RoaRequestIntro.
4. Director will receive e-mail notification to electronically approve, modify or deny the completed on-line ROA form. Packages for each school must be completed and approved by the center's Director or Assistant Director before a certificate is issued. Upon on-line approval, ROA packages will automatically be logged in the appropriate database for review and processing by Thomas Wenning, (via her assistant, Susie Allen). **The ORNL review process occurs 3 times per year. ROA forms may be submitted at any time, however the deadline for each processing period is as follows: March 1, July 1 and October 1.** ROA forms received after these dates will automatically be placed in the queue for the next scheduled certificate review period.
5. ORNL issues a memo to DOE requesting certificates for compiled list of approved students.
6. Certificates are mailed to centers to be signed and distributed by the center Director. Students may request a copy of their ROA to accompany the certificate.

Questions and Clarifications

Please direct all questions regarding certification and the certification process to Susie Allen (assistant to Thomas Wenning) via phone at 865-740-4684 or email at allensc@ornl.gov.

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IACForum vs. IAC.Rutgers

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IACForum.org

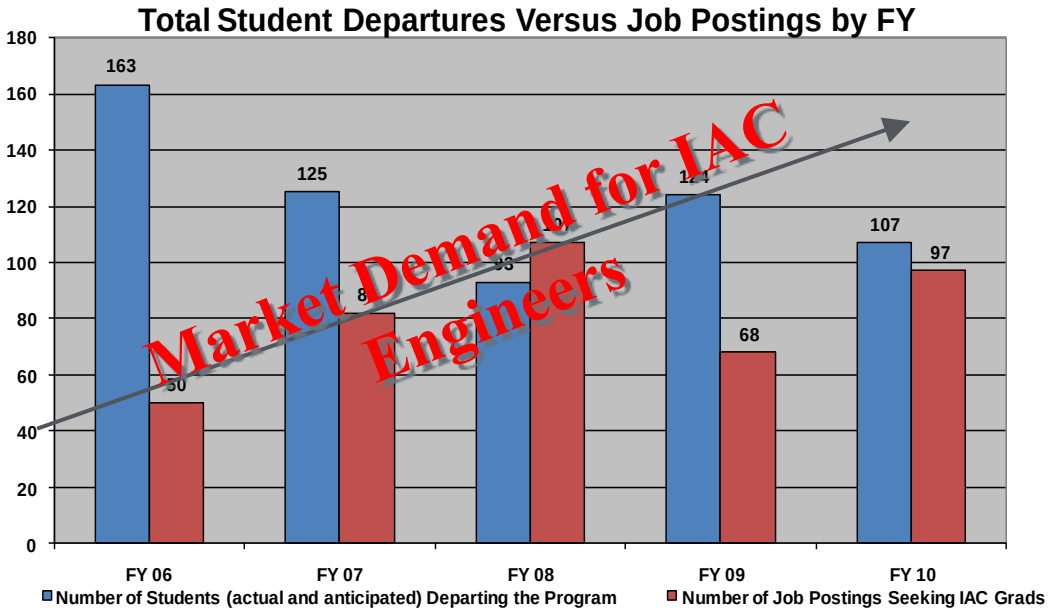
- Registry – Student Records Database
- Job & Resume Postings
- Newsletters, Presentations, and Current Announcements

IAC.Rutgers.edu

- Assessment Metrics Database
- Assessment Uploads

IAC Student Forum Website

- Offers a window to IAC students and alumni for potential employers, policymakers, media, non-IAC schools
- Important announcements are listed on the home page
- Many students and alumni use the website to share information about their work
- We are always interested in new articles and highlights
- The career section is VERY effective at matching IAC students and alumni with energy-focused employers
  - Post resumes regularly
  - Remember to check the site frequently for new job opportunities!!



Student Registry and Exit Interviews

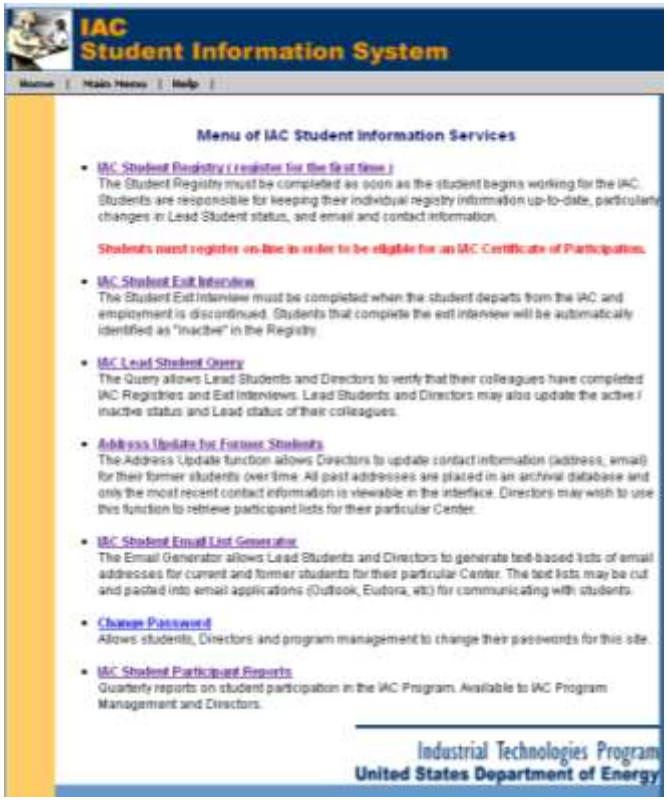
- Located at: **http://www.iacforum.org/**

- **Lead Student Responsibilities**
  - Ensure that all students complete the registry when entering the IAC
  - Ensure that all students complete the exit interview when departing the IAC
  - Ensure that lead/active/inactive status information on students is current

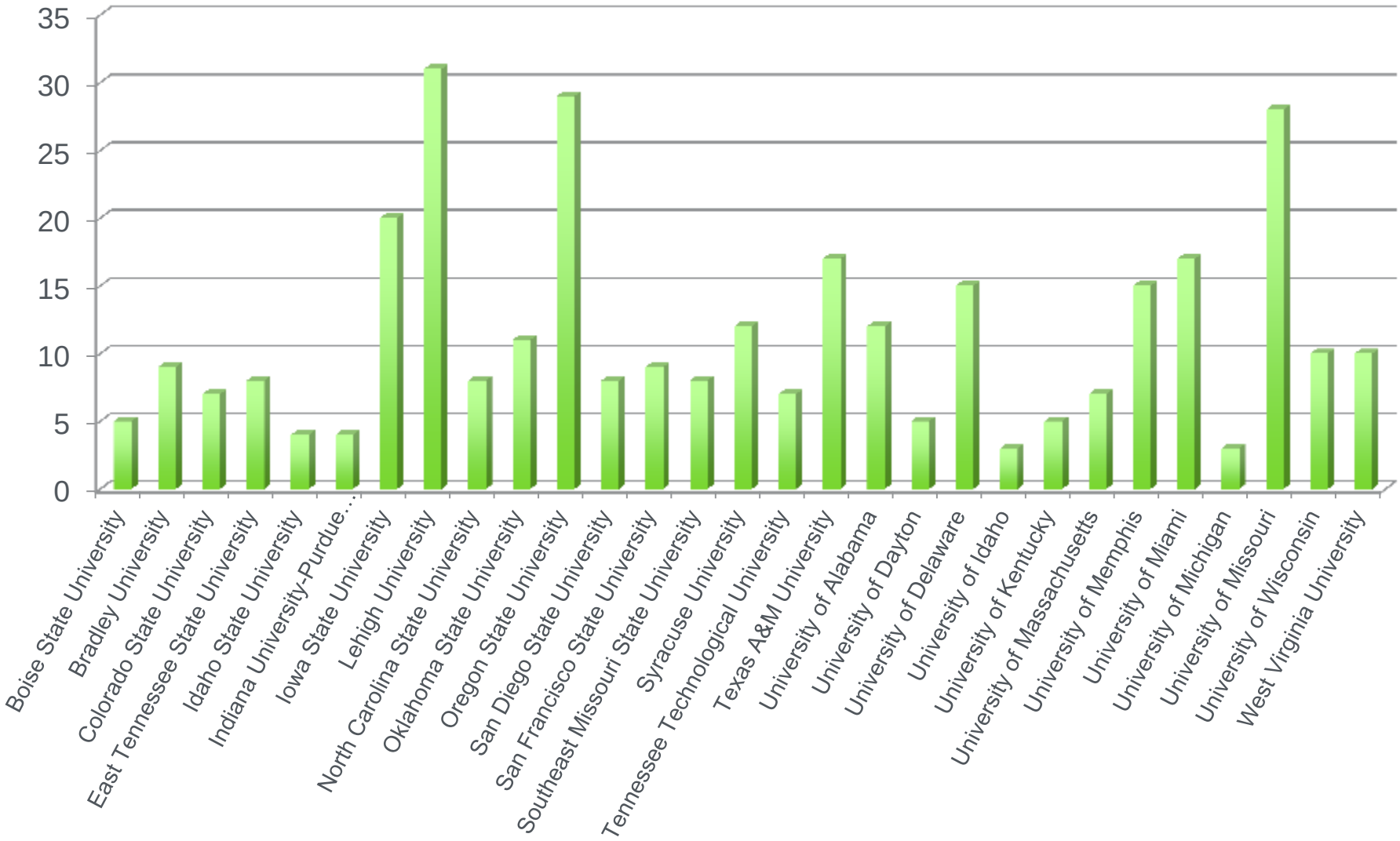
- Lead Student Query should be used to maintain student status information regularly
  - Active/Inactive student status
  - Deactivating students:
    - Lead students should change status of students who departed without an exit interview.
    - Deactivation requires reason for departure and updated contact information.
  - Lead Student(s) appropriately identified
  - Update contact information for alumni

Registry Issues

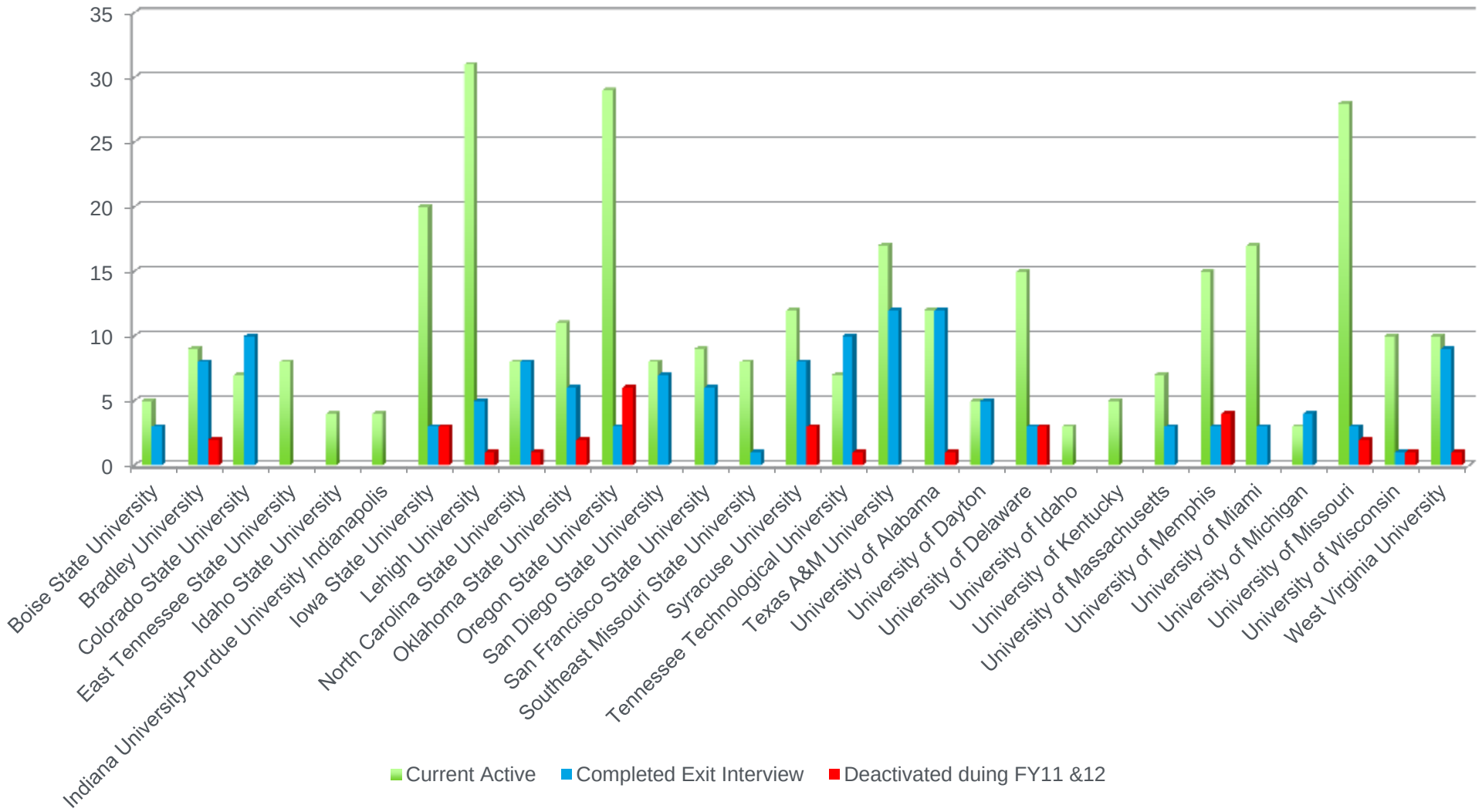
- All Students MUST complete an IAC registry record when joining their respective centers
- An exit survey must be completed by each student prior to their departure from the IAC program
- It is important that the IAC Student Registry be accurate and up-to-date



Registry: Current Students



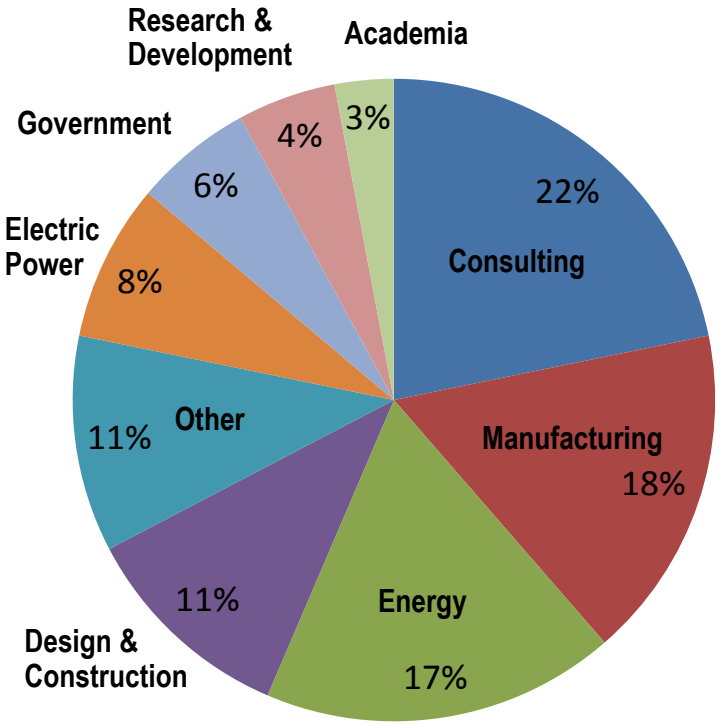
A Closer Look…

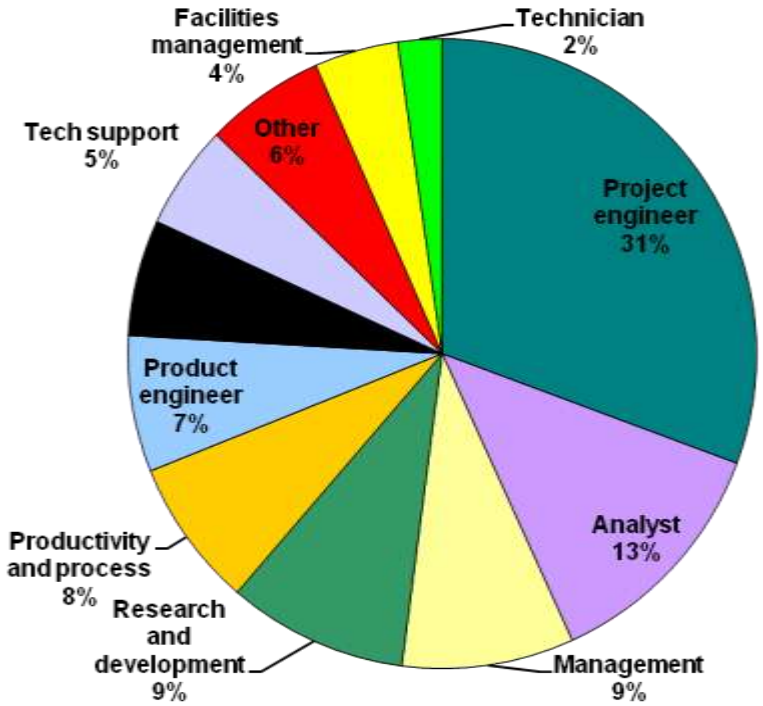


– Please review list of active students for accuracy!

Why This Is SO Important

- Registry data defines the number of students in the IAC at any time
- Exit interviews identify the number of students that are departing for careers in energy





The IAC Difference

"We get a real world perspective of a variety of industries. We learn about conservation and things companies need to do to save energy and money." –Andrew Hanegan, Texas A&M IAC

IAC students recording pump data at a manufacturing plant

An IAC student engineer uses an infrared gun at a manufacturing plant

IAC Alumni:
Leaders in the Green Workforce

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Adam Knapp, (MS, PE, MBA, CEM) IAC Syracuse University

- Operations Leadership Associate at United Technologies
- Evaluated opportunities in the UK energy performance contracting market as research for MBA from Oxford University
- Former Project Engineer at Clough Harbour and Associates

Ben Erpelding (M.S., P.E., C.E.M) IAC San Diego

- Director, Optimum Energy LLC.
- Over 11 years of experience in energy efficiency
- Performed over 500 detailed HVAC energy assessments
- Erpelding's efforts over the last 6 years resulted in a 16% decrease in San Diego County's energy consumption

Gary Epstein, IAC University of Massachusetts

- UMass IAC Alumni founded ERS, Inc.
- The primary objective at ERS, Inc. is to assist utilities, government and large commercial and industrial end users solve complex energy and resource problems in a cost effective manner.

Upcoming Events for Next Year:

Newsletter

- **Call for articles and briefs will go out by the end of the month**
- IAC news briefs from all centers
- Ideas for articles from students and alumni are accepted all year

Webinars

- Avenue of collaboration
- Topics of student interest?

2013 Student Meeting

- Location thoughts?
- Looking for new ideas and presentations from (& for) our students

Newsletter Examples

Syracuse University. The Syracuse University IAC had another exceptional year, full of learning experiences and successful energy assessments. Evan Beckerman received his B.S. in Mechanical Engineering and is currently employed in California. Chris Buttitta, a long-time employee of our center as an undergrad, began his M.S. in engineering management and will continue his duties as an employee of the center. Chris is also working to design a lift to assist disabled veterans with wheelchairs board charter fishing vessels a Oswego. Our center has also grown in size, undergraduates Brian Granetz and Cole Tu students Brandon Peery and Phil Gwyther their director Fred Carranti to write a porti that is pending publication in *Bioscience*. T looked at the effectiveness of combined he installations on the carbon footprint of sev the Northeast.

Tennessee Tech. The Tennessee Tech Univ partnering with Schneider Electric Corpora efforts in the Save Energy Now LEADER pr of the program, Schneider has pledged to r energy intensity by 25% over the next 10 y and Schneider are participating in the Sout Management Demonstration project to as companies in achieving these and other en TTU will be supporting Schneider in numer including assisting with establishing an ene baseline and creating an energy managem identifying energy savings opportunities, a with procuring technical assistance or finar for implementation of energy efficiency pr TTU IAC will also be consulting with Schnei development of their ISO 50001 Energy Ma system and their certification in the Superi Performance program.

Texas A&M University. Five Aggies have applied for and received IAC certificates.

University of Washington. In 2010 ther certificates awarded to IAC students.

West Virginia University . The WVU-IAC regular assessments, and the reports foc QuickPep, MotorMaster+, 3E Plus, SSST a Practices Software tools. The assessment

University of Missouri-Columbia IAC Partnered with Columbia Water & Light

Chatchai Pinthuprapa, University of Missouri IAC Lead Student; cp2nf@mail.mizzou.edu

The MO-IAC partnered with Columbia Water & Light, a service provider in Columbia, MO, to conduct a motor assessment for Columbia Water Treatment Plant this summer.

Columbia Water Treatment is the largest water treatment plant in Columbia. It supports the daily water supply for Columbia. It includes a filter building, lime building and more than 20 wells outside the plant. There are more than 60 motors in the plant which burn a huge amount of energy every year.

Dr. Bin Wu climbing on the top of the well at Columbia Water Treatment well station

anticipated that a group of IAC directs will be invited to the UAIEE first official directors' meeting the following year.

San Francisco State University IAC Performs Assessment at Chocolate Factory

Dan Lake, IAC Student, SFSU
dplake1980@gmail.com

In the past year the SFSU-IAC team visited two full-scale chocolate manufacturing facilities, both with global

Left to right, Vish Ganti, Mohammad Ganji, Dr. Ahmad Ganji,

Daniel Lake, Lana Banotan Agot, Michael Green

annual sales above $50 million and annual energy costs at or above $1 million. Due to the facilities' grandeur, scale, and complex processes they offered numerous opportunities for energy conservation. This was a great experience for our team, putting our analytical abilities to the test and providing an opportunity for the team to grow.

Both facilities process chocolate from raw cocoa bean to finished product. The process begins with passing the cocoa beans over a shaker table in order to remove small stones and other foreign objects. Next the beans are

Winnowing Process

Once separated from the shells the cocoa nibs are passed through a grinding mill which breaks them down into a warm paste consisting of particles of cocoa powder and cocoa butter (fat) referred to as chocolate liquor. If the chocolate liquor is not immediately molded into chocolate, the liquor and cocoa powder cake is separated by pressing the liquor through fine screens. The cocoa powder cake is either packaged and shipped or used to make other chocolate products. The next steps in the production of chocolate are the refining and conching processes. Typically treated as two separate steps in chocolate manufacturing, conching and refining have the same goal, which is to further break down and mix cocoa particles with other ingredients such as milk and sugar with a controlled application of heat. The conching

Conching Process

Repeating once more…Please Help!

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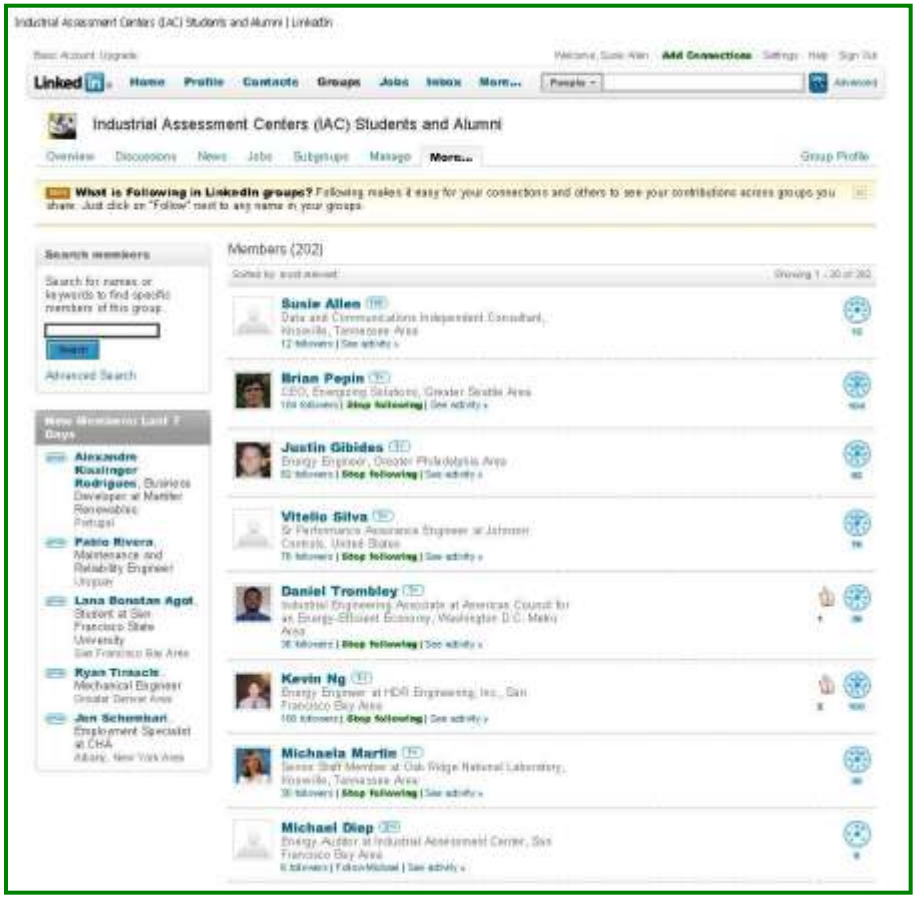
1. **Newsletter articles and university briefs**
2. **Pictures**
3. **Video Clips**
4. **Stories & Articles**
5. **Alumni Case Studies Suggestions**
6. **Presenters for webinars and IAC student meeting**
7. **Please keep on your Lead Student to maintain the registry**

LinkedIn IAC Group

- Established in year 2008
- Professional networking site for IAC students and alumni
- 382 members and counting
- News items, professional profiles, discussions



Thank You!

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Thomas Wenning

IAC Student Activities Coordinator

Oak Ridge National Laboratory

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