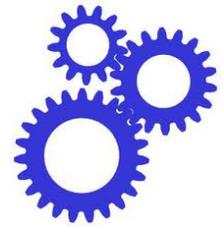




ME NEWS



MAY 2019

2017-2018 ME Division Chair: David Mikesell

Division Chair's Letter

Dear ASEE Mechanical Engineering Division members and fans:

Our field of Mechanical Engineering continues to boom and change, and only grow in relevance as solutions for many of the grand challenges of our age are in the hands of our graduates. Engineering educators need to keep pace with new technologies such as additive manufacturing, autonomous navigation, hypersonic flight, and more.

Engineering educators likewise need to keep abreast of educational research to maximize our effectiveness. The ASEE Annual Conference and Exposition is a fantastic place to do that. Come this June to hear others discuss intriguing pedagogies such as competency-based assessment, which is gaining popularity. Or learn about technologies and platforms to support distance learning, or lesson delivery methods which maximize student success and skill retention.

Come share your own ideas, and gather new ones. Strengthen your old connections with peers all over the continent, and forge new ones.

If you would like to play an active role with the ME Division, there are lots of ways to get involved. The Awards Selection Committee does the important work of recognizing excellence through the prestigious [Ralph Coates Roe Award](#) and the [Outstanding New Mechanical Engineering Educator Award](#). Or join the Executive Committee and shape the division's future, whether as an at-large member or cycling through the leadership positions of Secretary/Treasurer, Program Chair, and Division Chair.

Please contact me at the email below if you have interest in getting involved at any level. Or simply come to the [Business Meeting](#) at the conference in June, Tuesday 5pm. The ME Division leaders are a

great group of people, and my own career has been enriched by getting to know and work with them.

Speaking of which, I am grateful to Diane Peters, our newsletter editor and webmaster who put this issue together. And to Tom DeNucci, who came up with the great idea to have the [ME Convivium](#) this year on a yacht. I think that this is the first year that this event has sold out over a month before the conference! If you did not get a chance to register, you might periodically check the website to see if tickets have become available. Program Chair Matt Gordon has been coordinating all of the reviews for the 60+ papers in 11 technical sessions plus a poster session. Thank you to all who submitted work, and all who helped with reviews! I'm looking forward to seeing you there.

With best regards,

David Mikesell
Associate Professor and Chair
Mechanical Engineering Department
Ohio Northern University
ASEE ME Division Chair 2018-19
d-mikesell@onu.edu

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Suggestions, feedback, and contributions for future editions may be sent to the Editor, Diane Peters, email: dpeters@kettering.edu

ASEE ME Division Convivium

The Mechanical Engineering Convivium is a Division supported dinner where all members and guests are invited to attend. Tom DeNucci, from the Coast Guard Academy, has organized the event this year. Capitalizing on the "Bay" in Tampa Bay, Tom has organized a dinner cruise through Yacht StarShip, America's first three diamond rated Dining Yacht. Dinner will include a salad, pork, poultry, fish and vegetarian options, as well as desert.

Boarding time will be 6:30 pm near the Convention Center with a sail time of 7:00 pm. The ship will return to the dock at 9:00 pm.

TICKETS MUST BE PURCHASED THROUGH THE ASEE ONLINE REGISTRATION SYSTEM BY JUNE 1st TO ATTEND THIS EVENT. COST IS ONLY \$30 PER PERSON. ATTENDANCE IS LIMITED TO 60. ON-SITE SALES OF THESE TICKETS WILL BE LIMITED AND MAY NOT BE AVAILABLE.

This will be a great opportunity to enjoy Tampa Bay from the water, socialize, renew old friendships and make some new ones!

ME Division Award Winners

At the Annual Conference, the ME division will be honoring two winners of our awards. The Roe award will go to Ramesh Agarwal, Washington University in St. Louis, Mechanical, Aerospace & Structural Engineering. The ME Young Educator Award will be presented to Krishna Pakala, Boise State University, Mechanical & Biomedical Engineering.

ASEE ME Division Executive Committee 2018-2019

Our division's current officers are:

Chair: David Mikesell, Ohio Northern University
Program Chair: Matthew Gordon, University of Denver
Program Chair-Elect: Tom DeNucci, USCGA
Secretary/Treasurer: Rungun Nathan, Penn State University
Nominating Committee Chair: Michael Benson, USMA
Awards Selection Chair: Anna Howard
Webmaster/Newsletter Editor: Diane Peters, Kettering University
Members at Large: Pavan Karra, Trine University (2018-21) and Chuck Baukal, John Zink Company, LLC (2016-19)

Notes from the editor

Newsletter Contributions. I am always looking for great articles for this newsletter, similar in style and length to the type you see within this edition. Feel free to submit great articles anytime even though the newsletter is produced only in the fall and spring. Just email your articles directly to me or any of the Division officers (listed on page 6). The ME Division website is also a good place to find current events and lists of important contacts and dates. If you have details you would like the entire division to see, send them to me as well.

The division website location is the same as you have previously seen: <http://mechanical.asee.org/>. Watch for upcoming updates to the website. We look forward to serving the division and meeting your mechanical engineering educational needs.

DOE EPSCoR Grant Pays Research Dividends

In 2006, the U.S. Department of Energy (DOE) and Experimental Program to Stimulate Competitive Research - or EPSCoR - awarded 2.25 million to West Virginia University for coal syngas research. The project had two primary goals: to build infrastructure and work force at WVU to support long-term research in the area of fuel cells and related sciences and to study the effects of various impurities found in coal-syngas on performance of solid oxide fuel cells. Significant accomplishments can be traced directly to the project. Although the project ended in 2014, the SOFC research has never left WVU. It has been a source of continuous stream of new funding, additional faculty, and recognitions.

The characterization and processing equipment acquired from this project is some of the most used in the WVU's Shared Facilities. These include cell manufacturing, half-cell and full-cell test benches, X-ray photoelectron spectroscopy, X-ray diffraction, transition electron microscopy, raman, energy dispersive analysis X-ray, secondary electron microscopy, electrochemical impedance spectroscopy, and environmental secondary electron microscopy equipment, unique in-situ measurement techniques and test benches. During the project, novel computational capabilities have been developed culminating in a multi-scale multi-physics fuel

cell simulation code, DREAM-SOFC, as well as a Beowulf cluster with 64 CPU units.

The EPSCoR's SOFC project initially included several MAE faculty as Co-PI's: Drs. Ismail Celik, Bruce Kang, Xingbo Liu, and Nick Wu. In 2008, Ed Sabolsky and Xueyan Song were recruited to participate on the project, and both were quickly promoted to the tenured associate professor level. In 2012, Dr. David Mebane strengthened the computational area of the SOFC research. During the project, the faculty has trained 16 graduate students, 10 postdoctoral fellows. With the help of these faculty and students, 14 research awards/contracts in closely related areas of research were secured.

Since 2014, the SOFC research continues to bring in funding and graduate students. In 2015, Xingbo Liu was awarded a prestigious DOE Advanced Research Projects Agency–Energy contract to develop an intermediate temperature fuel cell for converting natural gas into electricity and liquid fuel. Also in 2015, Ed Sabolsky and Kostas Sierros together with General Electric (GE), National Energy Technology Laboratory (NETL), and Nexceris, a research and development company well known for SOFC development, won funding for development of high-temperature sensors for monitoring processing conditions within fuel cell stacks. One year later, Sabolsky and Liu teamed up again with GE and NETL to develop novel anode materials. Song, Liu and Sabolsky have continuous collaboration with NETL and are all participants in Solid State Energy Conversion Alliance projects. SECA is a collaboration between federal government, private industry, academic institutions and national laboratories focused on development of low-cost, modular, and fuel-flexible solid oxide fuel cell technology suitable for a variety of power generation applications.

The EPSCoR project and investment in fuel cell research has achieved all its goals. From the continuous stream of new contracts in SOFC-related research to the role of EPSCoR acquired characterization equipment to fuel cell and other research, its impact is still reverberating through the Department of Mechanical and Aerospace Engineering. The question is what will be the next new project or research area that will emulate this achievement?

Positions Available

The Department of Mechanical Engineering at California Polytechnic State University, San Luis Obispo, CA, invites applications for a full-time, Post-Doctoral Teaching Fellow appointment as a Full Time Lecturer. This teaching Program seeks to attract and prepare outstanding individuals with completed PhD's for a successful career in engineering academia by gaining teaching experience and training at a premier teaching-oriented engineering institution. Participants will primarily engage in teaching activities in fundamental or specialized engineering courses appropriate to their preparation. They will also be supported through mentorship by experienced engineering educators and through the University's Center for Teaching, Learning and Technology. Although the position primarily gives instructional training and experience, teaching will be reduced 20%-25% from a full-time position to allow participant to engage in scholarly pursuits subject to the limitations of available facilities and resources on campus. This is a full academic year appointment starting in September 2019 with the possibility of a one-year extension. This is an opportunity for Ph.D. recipients in engineering with an interdisciplinary mindset to join a unique institution that values undergraduate education and applied research activities. To apply, go to:

www.calpolyjobs.org/applicants/Central?quickFind=167504



**STATLER COLLEGE OF ENGINEERING AND
MINERAL RESOURCES
DEPARTMENT OF MECHANICAL AND AEROSPACE
ENGINEERING**

The Department of Mechanical and Aerospace Engineering (MAE) at West Virginia University (WVU) invites applications and nominations for tenure-track faculty positions in the area of robotics, with special emphasis on robotic manipulation, human-robot interaction, space robotics, artificial intelligence, and soft robotics. The research track record of the successful candidates in these areas is considered to be more important than his/her particular focus or expertise in a highly specialized subject. The positions are anticipated to be filled starting in August 2019, or as early as January

2019, at the level of Assistant or Associate Professor, depending upon qualifications.

Eligible candidates must hold an earned Doctorate degree in robotics engineering, aerospace engineering, mechanical engineering, computer science, electrical engineering, or a closely related field, at the time of appointment. The successful candidate must have the ability to (1) teach lecture, laboratory or design courses at both the undergraduate and graduate levels, (2) develop and sustain an independent, nationally recognized, externally-sponsored research program, (3) collaborate within multi-disciplinary teams of faculty and other researchers across colleges and institutions, and (4) perform professional service activities. A notable record of peer-reviewed publications and other scholarly activities, effective communication skills, and evidence of potential to attract competitive research funding are required for these positions. Candidates for the rank of Associate Professor must also have an outstanding record of teaching, research and service.

West Virginia University is the comprehensive Land Grant University of the State of West Virginia with a main campus enrollment of over 29,000 students, and a Carnegie Classification of Highest Research Activity (i.e., R1 University). Morgantown and its vicinity have a population of about 137,000 residents and are ranked among the most livable small cities in the country. The community lies within a high technology corridor that also includes several federal research facilities, such as the NASA's Independent Verification and Validation Facility (IV&V), U.S. Department of Energy's National Energy Technology Laboratory, the National Institute of Occupational Safety and Health (NIOSH), and the Federal Bureau of Investigation (FBI). The city is located within reasonable driving distances from Pittsburgh, PA and Washington, DC. Additional details on the area and the university are available at <http://www.morgantownwv.gov> and <http://www.wvu.edu>.

Morgantown is a safe, inclusive, and family-friendly community. WVU provides faculty members with a supportive environment for developing a visible and productive career (<https://talentandculture.wvu.edu/new-employees>) and

a range of progressive policies to support work-life integration (<https://faculty.wvu.edu/policies-and-procedures/work-life-integration>). WVU also offers a Dual Career Program to assist partners in their career transition and job search and belongs to the OH/Western PA/WV Higher Education Recruitment Consortium (<https://www.hercjobs.org/oh-western-pa-wv>).

The WVU Statler College currently has eight academic departments with over 4,700 students and 135 faculty members. It is nationally recognized for high quality teaching and research, as well as for its excellent faculty and students. The MAE Department has 35 tenure-track or tenured faculty members, over 700 undergraduate and 135 graduate students. It offers degrees at the B.S., M.S., and Ph.D. levels, including dual B.S. degrees in both aerospace and mechanical engineering. The department has a yearly research expenditure of over \$12 M. Several members of MAE faculty and students participate in the West Virginia Robotic Technology Center (WVRTC). Our team has also recently won the NASA Sample Return Robot Centennial Challenge with a total of \$855,000 in monetary prize.

To apply for this position, visit www.jobs.wvu.edu. Applicants must submit a cover letter, curriculum vitae, a two page research statement, a one page statement of teaching philosophy, and contact information for at least three professional references. Only candidates who submit complete documentation of professional quality will be considered in the review process. For further information, please contact the MAE department Chair, Dr. Jacky Prucz, by telephone (304-293-3131) or e-mail (jacky.prucz@mail.wvu.edu) or visit the MAE website at <http://www.mae.statler.wvu.edu>.

West Virginia University is an Equal Opportunity/Affirmative Action Employer and the recipient of an NSF ADVANCE award for gender equity. The University values diversity among its faculty, staff and students, and invites applications from all qualified individuals, including minorities, females, individuals with disabilities, and veterans. The MAE department values intellectual diversity and demonstrated ability to work with diverse students and colleagues.

Campbell University

POSITION: Assistant, Associate, or Full Professor of Mechanical Engineering

DEPARTMENT: School of Engineering

STATUS: Full Time, Tenure Track

The School of Engineering at Campbell University (<http://www.campbell.edu/engineering/>) seeks to hire a Mechanical Engineering faculty member to fill a full-time, tenure-track position at the rank of Assistant, Associate or Full Professor beginning August 2019 or January 2020. The primary role of this faculty member is to develop and teach thermo-fluids topics.

In the Fall of 2016, Campbell University welcomed its inaugural freshman class to the newly formed School of Engineering. The School awards a single degree, the Bachelor of Science in Engineering, with concentrations in Mechanical, Chemical, and Electrical Engineering. It is undergraduate-focused, incorporating innovative approaches to engineering education and evidence-based practices in what we call ClassLab courses that blend content and hands-on experiences. As the school continues to grow, we seek faculty who are excited to develop new courses, design interactive educational spaces, and develop well-rounded engineers.

ClassLab courses are limited to 24 students, allowing faculty and students to get to know each other while they focus on developing strong foundations in engineering fundamentals. Beyond technical content knowledge, the School of Engineering seeks to develop well-rounded engineers through its eight departmental values, professional development and service opportunities, and a focus on professional excellence through internships and other related experiences. Faculty with an interest in engineering education research and practice are particularly encouraged to apply.

Campbell's proximity to North Carolina's Research Triangle Park provides numerous opportunities for collaboration with other universities and corporate partners. Other Campbell programs, including multiple health science programs, allow for strong collaborations across our own institution.

This position intends to develop and implement the thermo-fluids sequence of courses including thermodynamics, fluids, and heat transfer, as well as teach courses in Mechanical Engineering as appropriate and needed. As an Assistant, Associate or Full Professor, this scholar has a unique opportunity to provide

leadership in building an innovative engineering program and in building the prominence of the new School and the University. Candidates must be committed to undergraduate engineering education and be dedicated to excellence in undergraduate teaching, mentoring students, and scholarship.

Essential Duties and Responsibilities:

- Develop and implement the thermo-fluids sequence of courses including thermodynamics, fluid, mechanics, and heat transfer.
- Teach introductory and upper level engineering courses in Mechanical Engineering, as appropriate and needed.
- Develop an active agenda in the scholarship of teaching and learning in engineering.
- Provide service to the School of Engineering and the University through student mentoring, advising student organizations, school educational outcomes assessment and related accreditation activities, and school committee and faculty committee responsibilities as appropriate.

This position demands accuracy, honesty, integrity and the ability to work within the Christian mission of Campbell University.

Maintain a professional appearance and demeanor at all times.

Other duties, responsibilities and activities may change or be assigned at any time with or without notice.

Education/Experience:

- Ph.D. in Mechanical Engineering, or related engineering discipline from a regionally accredited institution of higher education.
- Expertise in teaching at the undergraduate level and knowledge of the current practices and research pertaining to innovative undergraduate engineering curricula.
- Experience developing and teaching hands-on, project-based engineering courses.
- Experience in a higher education or non-profit sector is also desirable.

Knowledge, Skills, and Abilities:

- Communicate effectively to all groups through both oral and written channels.
- Demonstrate tact, a positive attitude, courtesy and discretion in dealing with trustees, faculty, staff,

students, high-level university officials and the public.

- Work independently as well as function effectively in a team and within a diverse group of people.
- Exercise independent judgment in complex and new situations.
- Manage multiple, concurrent projects, and meet strict deadlines.
- Willing to work in a changing environment.
- Uphold and abide by Campbell University policies and procedures, including but not limited to; Title IX and FERPA guidelines.

Other Information:

A review of applications will begin immediately and continue until the position is filled. Compensation will be commensurate with qualifications and experience. Benefits include health, disability, and retirement plans.

To Apply For This Position:

Campbell University is unable to accept paper or email applications. Visit us online at <http://www.campbell.edu/employment/> to apply. Please submit a cover letter, resume and contact information for three professional references. If you have any questions, or if you are an individual with a disability and need assistance completing an application for employment contact the Human Resources Department at 910-893-1256 or email employment@campbell.edu. Campbell University is an Equal Opportunity Employer.

Workshop on Mechatronics Education

Dear Colleagues, we invite participation in the 3rd workshop on the Future of Mechatronics & Robotics Education to be held in conjunction with the 2019 ASEE Annual Conference & Exposition. This workshop will be held Sunday, June 16, 2019, in Tampa FL. Travel assistance is available through the generous support of NSF and Quanser. Refreshments are available through the generous support of Quanser.

This series of workshops is motivated by the tremendous, dynamic growth in Mechatronics and Robotics Engineering. To address the need for highly educated, multi-disciplinary professionals, many universities and colleges have introduced courses, minors, and degree programs; however, these efforts lack cohesion. Now is the time to unify and standardize educational material to make Mechatronics and Robotics Engineering education more widely available and easier to adopt.

The objectives of this workshop are to bring together industry and academic professionals in Mechatronics and Robotics, share experiences, and initiate efforts towards defining the field. We aim to encourage and facilitate the wide adoption of Mechatronics and Robotics degree programs. Workshop participants will learn about recent successes in offering these degrees, help influence the future of the field, and contribute to the growing Mechatronics and Robotics education community.

This workshop will benefit a wide range of ASEE participants including current educators teaching mechatronics, robotics, dynamics and control courses, future educators in mechatronics and robotics, and industry professionals desiring to shape the future workforce. There is no cost to attend and those who have not been selected for travel support are still encouraged to attend the workshop.

Organizers:

- Mike Gennert, Worcester Polytechnic Institute
- Vikram Kapila, New York University
- James Mynderse, Lawrence Technological University
- Nima Lotfi, Southern Illinois University Edwardsville

Important Dates:

- Jan. 7, 2019 Online registration opens
- Mar. 29, 2019 Applications for participant support due
- Apr. 5, 2019 Participant support notification
- Apr. 8, 2019 Early registration deadline
- Jun. 19, 2019 Regular / on-site registration and workshop

We look forward to seeing you at FoMRE @ ASEE 2019! Mike, Vikram, James, and Nima

ASEE Conference Workshop: Leveraging Technology to Elevate Pedagogy

One of the workshops to be held at the upcoming ASEE Annual Conference is on Leveraging Technology to Elevate Pedagogy. Details below:

U238B-SUNDAY WORKSHOP: Leveraging Technology to Elevate Pedagogy

Sun. June 16, 2019 9:00 AM to 12:00 PM

Florida Salon I , Tampa Marriott Waterside - HQ Hotel

Session Description

Ticketed event: \$10.00 advanced registration and \$20.00 on site registration

Studies indicate that widespread mobile device ownership does not directly correspond to the proficient use of mobile technology for learning. How can faculty be better prepared to meet this challenge? Participants in this workshop will engage in active learning to analyze a variety of different teaching techniques, identify best practices for meeting learner' needs, and design a plan for mobile learning integration in their courses. Evaluating and integrating current technology into the curriculum is essential to meeting 21st century educational expectations and workplace demands. To maximize student success, over the past several years we explored how to use progressive learning theories, coupled with innovative mobile technologies. We employed new and innovative ways to use mobile technology (predominantly Apple iPads), to foster and assess student learning. In this workshop, we will provide few examples of how mobile technology can improve student's self-efficacy and their perceptions and attitudes about engineering. Some of the examples will include digital content created by students, interactive note taking, virtual office hours and more. Mobile Learning technologies have been providing a platform for active learning, collaboration, deep learning, and innovation in certain disciplines of higher education for quite some time now. By utilizing mobile technology, we aim at impacting students learning through taking student-centered approach.

In this workshop participants will:

1. Pair and discuss the current state of mobile device integration at their individual institutions
2. Experience teaching and learning implementations with mobile technology
3. Work in small groups on case studies

Speakers

1. Dr. Krishna Pakala

Boise State University

Dr. Krishna Pakala is a Clinical Associate Professor in the Mechanical and Biomedical Engineering Department at Boise State University, Boise, Idaho. He teaches courses in the thermal and fluid science discipline including a first-year course. He is the Faculty in Residence for the Engineering and Innovation Residential College and also the Faculty Associate for Mobile Learning. He serves as the Assistant Director for the Industrial Assessment Center at Boise State. He received his Bachelors at Jawaharlal Nehru Technological University, Hyderabad and Masters from Arizona State University. He received his Ph.D. from University of Wyoming. All his major study was in the field of Mechanical Engineering. Although he had pursued creative and independent research during his graduate studies, he found that his calling is toward teaching and methods to improve teaching and learning. His academic research interests include innovative teaching and learning strategies, use of emerging technologies, and mobile teaching and learning strategies. His long term goals are creating multimedia, high-impact and digital delivery of course content. He is also interested in developing and exploring new methods for knowledge delivery and is also interested in scholarship of learning. He is the recipient of David S. Taylor Service to Students Award and Golden Apple Award from Boise State

University. He is also the recipient of ASEE PNW Section Outstanding Teaching Award. He serves as the campus representative (ASEE) for Boise State and also as the Treasurer for the ASEE PNW Section.

2. Dr. Diana Bairaktarova

Virginia Tech

Dr. Diana Bairaktarova is an Assistant Professor in the Department of Engineering Education at Virginia Tech and the Director of the Abilities, Creativity and Ethics in Design [ACE(D)]Lab. She is also an Affiliate faculty in the Department of Mechanical Engineering and in the Program of Human-Centered Design at Virginia Tech. Bairaktarova's research and teaching focus on enhancing engineering design learning with the end goal of helping engineers become creative problem solvers and thinkers for improved human experience. Her extensive industry experience includes working as a design engineer for more than fifteen years, including several joint-effort research projects with Boeing, Northrop Grumman, Lockheed Martin, and other defense companies. Her research focuses on shifting the perspective of design education from an emphasis that relies too heavily on the product to a focus on the experiences of end-users and designers in the design process. By applying an interdisciplinary approach to engineering design, Bairaktarova uses design science as a basis for doing research. Her work in engineering design and engineering education is complemented by her ongoing research on the learner and learning environments that develop and enhance learners' abilities.

Wind Tunnel (1) for Sale

Boise State University is selling a wind tunnel. Pictures are shown below, and further information (including how to bid on it) is given at the end of the newsletter.





Wind Tunnel (2) for Sale

Ohio Northern University is selling a 10hp recirculating wind tunnel with 8" x 8" x 12" test section. Pictures are shown below. Asking \$10,000, price negotiable. Contact Jed Marquart j-marquart@onu.edu for more pictures and data sheet.



Boise State University
1910 University Drive
Boise, ID 83725-1210

Invitation to Bid

Contact: Linda Chromey Phone: 208-426-1107

Boise State University is offering for sale a **Horizontal Wind Tunnel**. Appointments to view this item can be made by contacting Linda Chromey at 208-426-2228.

If you are interested in purchasing this surplus property, please read the following General Conditions and Instructions. Then complete this bid form and mail it to the BSU Purchasing Dept. at the above address or e-mail to lindachromey@boisestate.edu.

General Conditions and Instructions

1. The items are offered for sale "AS IS" and "WHERE IS" with no warranty expressed or implied.
2. Return signed bid to the Boise State University Purchasing Dept. (e-mailed or faxed bids are acceptable).
3. Bids received after the above listed deadline will not be accepted.
4. Payment for the items is to be made by cash, cashier's check, or certified check payable to Boise State University.
5. A receipt for payment will be issued at that time. Payment must be made in full before the successful bidder takes possession of the items.
6. The successful bidder will be responsible for payment in full and for removal of all items within a period of 14 calendar days after notification of award unless Boise State University agrees to a time extension. Items not removed within 14 calendar days will be disposed of by Boise State University without any refund to the successful bidder, and the bidder will not be allowed to participate in future BSU surplus property sales.
7. Successful bidder must provide personnel and equipment to remove surplus property from BSU.
8. Sales tax will be charged unless the successful bidder has tax-exempt status in Idaho.
9. Boise State University reserves the right to reject any bids.

Proposal for Purchase

Horizontal Wind Tunnel

- Belt driven impeller with 75hp variable speed motor: 75hp, 230/450v, 3 phase, 60 Hz.
- Non-overloading centrifugal fan in SWSI (single width, single inlet) design; airfoil fan is optimized for higher efficiency and less noise, and is well suited for use in clean air applications.
- Flow straightening section.
- 84" x 36" x 36" test section built of clear polycarbonate on all four walls to allow easy visual access and filming of experiments.
- Variable frequency drive enabling smooth control of speed up to 20 m/sec.
- Safety accessories including stairs, catwalks, and deflector.
- Size: 41.5' x 12' W x 16' H

I hereby understand and agree to the General Conditions and Instructions and submit the following proposal to purchase the item for the indicated amount:

\$ _____

Bidder is responsible for all packaging, crating, shipping, handling, delivery, labor and insurance costs

Signature & Date _____

Print Name _____

Company _____

Address _____

City, State, Zip _____

Phone no. _____

E-mail address _____