POLISH-AMERICAN ENGINEERS ASSOCIATION

FOUNDED IN 1934

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All members and friends of Polish-American Engineers Association are cordially invited to attend our meeting.

DATE: **Friday, November 15th, 2013**

TIME: **7:30 p.m.**

PLACE: **Copernicus Center**
Kings Hall
5216 W. Lawrence Avenue
Chicago, Illinois

SPEAKERS: **Professor Iwona Jasiuk, PhD**
Department of Mechanical Science and Engineering
University of Illinois at Urbana-Champaign, Urbana, IL 61801
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TOPIC: **Bone as a Structural Material**

Dr. Iwona Jasiuk received her Ph.D. in 1986 in theoretical and applied mechanics at Northwestern University. In 1986 she joined the faculty of materials science and mechanics at Michigan State University. Ten years later she joined the faculty in the G.W.W. School of Mechanical Engineering at Georgia Institute of Technology. In 2004-2005 she was on faculty of mechanical engineering at Concordia University in Montreal. Currently she is on faculty of mechanical engineering at the University of Illinois at Urbana-Champaign (UIUC).She also holds affiliate appointments in the Bioengineering Department and the Institute of Genomic Biology, and is a part-time faculty at the Beckman Institute at UIUC. She held visiting positions at the Science Center at Rockwell International in Thousand Oaks, CA (summer 1987), Tokyo Institute of Technology (summer 1990), Institute for Mechanics and Materials at the University of California at San Diego (spring 1994), Wright Patterson Air Force Base (summer 1994), and the Institute for Mathematics and its Applications at the University of Minnesota (fall 1994).

Dr. Jasiuk's expertise is micromechanics of composite materials and biological materials. She has over 80 refereed journal publications and over 60 conference publications. She presented her research at over 100 conferences and in over 50 invited seminars (including several distinguished seminars) nationally and internationally. She served as a dissertation advisor of over 40 graduate students and as a research advisor for numerous undergraduate students. She is an editor of *Journal of Mechanics of Materials and Structures* since 2009 and has served on editorial boards of the *International Journal of Solids and Structures* (1996-2005), *International Journal for Multiscale Computational Engineering* (2004-present), *Journal of Mechanics of Materials and Structures* (2005-2009), *International Journal of Damage Mechanics* (2006-present), *Computers in Biology and Medicine* (2011-present), *Journal of Surfaces and Interfaces in Materials* (2011-present),

Mechanics of Advanced Materials and Structures Journal (2011-present), and *Microscopy Journal* (2010-present). She has actively participated in several professional societies, including the Society of Engineering Science (SES). She has been a member of SES since late 1980's (Fellow in 2012). She served on the Board of Directors of SES (2000-2006), was vice-President (2005), and President (2006). At SES she was a Chair of Nominating Committee (2002-2003), Chair of Awards Committee (2004), Chair of Ad-Hoc Bylaws Committee (2007), and SES Representative to US National Committeeon Theorerical and Applied Mechanics (2007-2010). Finally, she was a Technical Chair of the 2008 SES Annual Conference at UIUC. She is a member of the American Society of Mechanical Engineers (ASME) (Fellow in 2003), the American Academy of Mechanics, the Orthopedic Research Society, and the Minerals, Metals and Materials Society(TMS).

Dr. Jasiuk's research contributions in the area of micromechanics of composite materials Her research on biological materials focuses on mechanics of bone. Her projects include multiscale characterization and modeling of bone's properties as a function of age and disease, bone adaptation due to exercise or disuse, and bone tissue regeneration. The last project addresses a design of new scaffolds for bone regeneration in critical sized long bone defects and modeling of the regeneration process.

Abstract

Bone is a structural material with excellent material properties for its application: high stiffness, strength and fracture toughness, and low weight. These superior properties are due to its complex composite random hierarchical structure. In this presentation we study bone as a hierarchical composite material. We distinguish the following length scales: nanoscale (1*nm* -1μm, apatite crystal and collagen fibril level), sub-microscale (1-10μm, single lamella level), microscale (10 -500 μm, single trabecula or osteon level), and mesoscale (1–10 *cm*, involving a random network of struts in trabecular bone, or a random arrangement of osteons in cortical bone). We model bone at each of these structural levels either analytically, using micromechanics theories, or numerically, using finite element approach. Results of this study have a wide range of application in orthopedics. Also, this research can serve as a framework for studying other structural materials with hierarchical structures and lessons can be learned from nature on how to design stiff, strong and light bioinspired materials.
In addition, we will discuss how to build and maintain strong bones, and how to assess bone quality. Finally, we will describe osteoporosis, the bone disease characterized by bone fragility and discuss its prevention, diagnosis, and treatments.
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Administration Updates

On October 18th the PAEA hosted two **filmmakers Barbara and Leonard Myszynski** who are working on a movie titled **"Bridging Urban America – The Story of Master Engineer Ralph Modjeski".** It is a documentary about one of America's leading bridge builders and his contribution to the modernization of America, transforming cities and commerce through innovation and ingenuity & how eight strategically designed North American superstructures remain globally significant today. The project is currently in production, sponsored by Eric Wintemute of American Vanguard, Modjeski & Masters, US Polish Trade Council, NY State Bridge Authority

and organizations such as the Polish American Congress-Illinois Chapter, Polish-American Engineers Association, Modjeski descendants, and private donors. Due to the scientific nature and complexity of the project, the project is seeking completion funding.

The filmmakers' goal is to build a cinematic history of Polish heritage for the next Polonia generation by making films about accomplished Poles in America available on DVD in both Polish & English.
Both are members of the International Documentary Association and Polish-American organizations, such as PNA, PAC, ACPC and the Polish University Club of Los Angeles.

We want to thank all members and sympathizers who contributed close to $7000 to this very worthwhile project.

On Sunday October 20th Polish American Congress hosted **The Heritage Awards Banquet**. Basia and Leonard Myszynski were the recipients of the award. Twenty members of PAEA attended the banquet.

Special thanks to one of our members Mr. Stanley Witczak. **Mr. Witczak donated $200 to our scholarship fund**. His company provides 3 to 1 matching of donations provided by their employees. Effectively Mr. Witczak is responsible for $800 addition to our 2014 scholarship fund.

Our **Christmas Party** is scheduled for **Sunday December 8th** starting at **4:00 PM** in Gala Banquets Hall on Milwaukee Avenue in Chicago. More details are forth coming in a separate invitation; and there will be an opportunity to make a reservation during our November meeting.

Structures Symposium
November 6, 2013
Maggiano's Little Italy 111 W. Grand Ave., Chicago, IL
Structural Engineers Association of Illinois (SEAOI)

The Structures Symposium provides a forum for engineers to share analysis, design, and construction information from recent projects with unique and/or distinguishing characteristics. Attendance typically represents a diverse cross-section of the all aspects of the profession, including design, construction management, material suppliers, academia, general contracting, and owners' representatives. The Symposium is comprised of a single day-long session including continental breakfast and a group luncheon. Attendees will receive 7.0 hours of continuing education credit for the Symposium. More information: http://www.seaoi.org

Seminars by Structural Engineers Association of Illinois (SEAOI)
http://www.seaoi.org

- **Designing Aluminum Structures** – December 11, 2013
  Seminar Location: Westin O'Hare
  Directors A/B – LL
  6100 River Road Rosemont, IL

- **Seismic Design of Buildings**, January 2014
  Seminar Location: Bloomington, IL

Arctic Technology Conference in Houston; 10 - 12 February 2014
Offshore Technology Conference (OTC)

This conference will deliver a highly specialized technical program built around five key topical areas: Geology and Geophysics; Exploration and Production; Physical Environment: Ice Loads; Logistics Marine and Transport; and Regulatory Environment and Social Responsibility.

About OTC
Founded in 1969, the Offshore Technology Conference organizes the world's foremost events for the development of offshore resources in the fields of drilling, exploration, production, and environmental protection. OTC is held annually at Reliant Center in Houston.

OTC ranks among the largest 200 trade shows held annually in the United States and is among the 10 largest meetings in terms of attendance. Attendance consistently exceeds 80,000, and more than 2,700 companies participate in the exhibition. OTC includes attendees from around the globe, with more than 120 countries represented at recent conferences.

OTC is sponsored by 13 industry organizations and societies, who work cooperatively to develop the program each year. OTC also has two endorsing organizations and ten supporting organizations.

OTC is governed by a Board of Directors made up of 14 representatives, 12 from OTC's sponsoring organizations and two from OTC's endorsing organizations.

Please visit: http://www.otcnet.org

2014 MEMBERSHIP DUES. Please note that the dues schedule for 2014 did not change. Dues are $50 per year, senior citizens and students $25 per year. We strongly encourage you to pay your dues in January or, if not possible, in February. 2014 membership cards will be provided to all those who paid their dues. Questions? You may inquire at the meeting or send an email to: paea.info@gmail.com