

Nuclear Notes

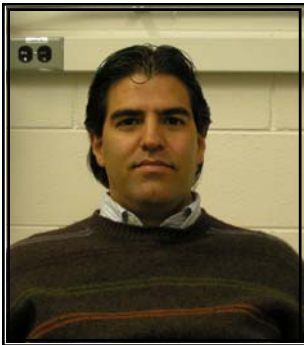
Nuclear Engineering
400 Central Drive
West Lafayette, IN
47907

Welcome back Students and Faculty!

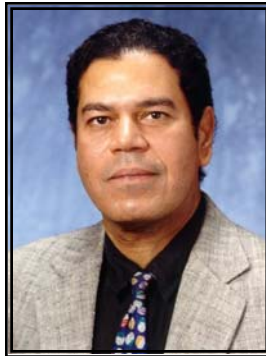
August 2007

A Message from the Interim Head

I would like to welcome everyone back. We are off to an exciting start with three new faculty.



Dr. Jean Paul Allain



Dr. Ahmed Hassanein



Dr. Igor Jovanovic

Please help us prepare for the ABET review that will be October 29th and 30th.



Funding Opportunities

NSF grant : PI Prof. Tatjana Jevremovic; Co-PIs Prof. Rong Gao, Prof. Lefteri Tsoukalas, Prof. Chan Choi, with Prof. Nicolas Burbakis from Wright University

Intelligent Model-Assisted Sensing System (iMass) for Fast and Accurate Special Nuclear Material Interrogation

The **iMASS** (intelligent Model-Assisted Sensing System) project will investigate a new nuclear detection approach using advanced modeling and simulation of detector response in realistic environment with minimal false alarms.

2007—2010 \$1,216,240

UNITY Hospital grant: PI Prof. Tatjana Jevremovic Python Controlled MCNP5 Based Radiation Treatment Planning Tool

The project purposes to develop, test and present to the *Faith Hope and Love Cancer Center* an advanced computational tool for radiation treatment planning.

2007—2007 \$5,200

DOE Grant: PI Prof. Rusi Taleyarkhan; PI Sean McDeavitt from Texas A&M University

The project entitled: NERI Consortium for Real Time Detection of Actinide Compositions in the UREX+ Process

2007-2010 \$2,100,000

New Faces in Nuclear Engineering

Along with three new faculty joining us this fall; we have 41 incoming sophomores and 12 graduate students also joining us.

The graduate students are listed below along with the University where they did their most recent studies and their major professors in Nuclear Engineering at Purdue.

Anthony Polloman—Purdue—undetermined
Benjamin Collins—Purdue—Professor Downar
Christopher Bailey—Purdue—Professor Bertodano
Daniel Rokusek—Massachusetts Institute of Technology—Professor Allain
Felisa Limon—Purdue—Professor Jevremovic
Gavin Henderson—Purdue—Professor Revankar
Joshua Schlegel—Purdue—Professor Ishii
Liyuan Zhang—Purdue—Professor Jovanovic
Ryan Coons—Miami University—undetermined
Shao-Wen Chen—National Tsing Hua University—Professor Hibiki
Somboon Rassame—Chulalongkorn University—Thailand—Professor Hibiki
Xue Yang—Tsinghua University—Professor Jevremovic

ANS News

ANS Officers:

President—Sheila Bolbolan
Vice President—Felisa Limon
Treasurer—Charlton Campbell
Secretary—Carrie Bloink

Committee Chairs:

Special Events Chair—Daniel Jabaay
Outreach Chair—Doug French
Corporate Chair—Kurt Walter

ANS News:

The ANS officers and committee chairs have been busy all summer planning an event packed year. We hope to have most if not all of the Nuclear Engineering community to be involved in ANS. This year we are hosting another acclaimed Nuke Week, more Outreach events, and many more member meetings throughout the year. We intend to send students to the HASTI and ANS conferences. Our callout is going to be held on Thursday August 30, 2007, time and location to be announced. ANS would like to do something for Family Day in September. Volunteers are needed, please contact Felisa Limon or Sheila Bolbolan. We still have a position for sophomore representative available. Nuke Week will be the last week of September and volunteers are needed, see Dan Jabaay, Felisa Limon or Sheila Bolbolan.



News and Awards



Professor Ishii and Professor Hibiki received the 2007 Engineering Achievement Award, Thermal-hydraulics Division, Atomic Energy Society of Japan in recognition of extensive and outstanding original research contributions to nuclear thermal-hydraulics and modeling of twp-phase flow.

Shao-Wen Chen received the Ross Fellowship

Daniel Rokusek received the Andrews Fellowship

Shilp Vasavada received the Donnan Fellowship

Bryan Sims received the Donnan Fellowship

Josh Duc received the UniStar Nuclear Scholarship

William Robbins received the Clikeman Scholarship

Caleb Brooks received the ANS Scholarship

Papers



T. Hibiki, T. Hazuku, T. Takamasa, and M. Ishii, “Some Characteristics of Developing Bubbly Flow in a Vertical Mini Pipe,” *International Journal of Heat and Fluid Transfer*/ (doi:10.1016/j.ijheatfluidflow.2007.01.001)

T. Hazuku, T. Takamasa, **T. Hibiki**, and **M. Ishii**, “Interfacial Area Concentration in Annular Two-phase Flow,” *International Journal of Heat and Mass Transfer*/, vol.50, pp.2986-2995 (2007)

K.Abe, Y. Hirose, T. Hazuku, Y. Fukuhara, T. Takamasa, and **T. Hibiki**, “Effect of Gravity on Interfacial Area Transport of Vertical-Upward Bubbly Flow,” *Progress in Multiphase Flow Research-II*/, pp1-8 (2007)

Hibiki, T., Ishii, M., Lift force in bubbly flow systems. *Chemical Engineering Science* (2007), doi: 10.1016/j.ces.2007.07.034

I. Jovanovic, M. Shverdin, D. Gibson, and C. Brown, “High-Power Laser Pulse Recirculation for Inverse Compton Scattering-Produced Gamma-Rays,” *Nuclear Instruments and Methods in Physics Research A* 578, 160-171 (2007)

B.Q. Deng, **J.P. Allain**, Luo Zheng-Ming, Peng Li-Lin, Yan Jian-Cheng, “Near-surface damage model for the study of material response of plasma-facing surfaces exposed to energetic charged particles,” *Nucl. Instrum. Methods in Phys Res. B*, 259 (2007) 847

C.P.C. Wong, D.L. Rudakov, **J.P. Allain**, R.J. Bastasz, et al., “Divertor and midplane materials evaluation system in DIII-D,” *J. Nucl. Mater.* 363-365 (2007) 276

J. P. Allain, M. Nieto, M. Hendricks, S.S. Harilal, **A. Hassanein**, “Debris and Radiation-Induced Damage Effects on EUV Nanolithography Source Collector Mirror Optics Performance,” *Proc. SPIE Int. Soc. Opt. Eng.* 6586 (2007) 31

J. P. Allain; M. Nieto; M. Hendricks; **A. Hassanein**; C. Tarrio; S. Grantham; V. Bakshi, “Energetic and thermal Sn interactions and their effect on EUVL source collector mirror lifetime at high temperatures,” *Proc. SPIE Int. Soc. Opt. Eng.* 6517 (2007) 66.

I. Jovanovic et al, "High Power Laser Recirculation for the ILC," Photon 2007: International Conference on the Structure and Interactions of the Photon, Paris, July 9-13, 2007

D. J. Gibson, S. G. Anderson, C. Barty, S. Betts, F. V. Hartemann, **I. Jovanovic**, D. McNabb, M. Messerly, J. Pruet, M. Shverdin, C. Siders, and A. M. Tremaine, "Optimal Design of a Tunable Thomson-Scattering Based Gamma-Ray Source," Particle Accelerator Conference, Albuquerque, New Mexico, June 25-29, 2007

F. V. Hartemann, S. G. Anderson, C. Barty, D. J. Gibson, C. Hagmann, M. Johnson, **I. Jovanovic**, D. McNabb, M. Messerly, J. Pruet, M. Shverdin, C. Siders, and A. M. Tremaine, "Gamma-Ray Compton Light Source Development at LLNL," Particle Accelerator Conference, Albuquerque, New Mexico, June 25-29, 2007

I. Jovanovic, S. G. Anderson, C. Barty, D. J. Gibson, C. Hagmann, F. V. Hartemann, M. Johnson, D. McNabb, M. Messerly, J. Pruet, M. Shverdin, C. Siders, and A. M. Tremaine, "High-Energy Picosecond Laser Pulse Recirculation for Compton Scattering," Particle Accelerator Conference, Albuquerque, New Mexico, June 25-29, 2007

S. G. Anderson, C. Barty, D. J. Gibson, F. V. Hartemann, **I. Jovanovic**, M. Messerly, M. Shverdin, C. Siders, A. M. Tremaine, H. Badakov, P. Frigola, B. O'Shea, and J. Rosenzweig, "Commissioning of a High-Brightness Photoinjector for Compton Scattering X-ray sources," Particle Accelerator Conference, Albuquerque, New Mexico, June 25-29, 2007

M. Shverdin, S. G. Anderson, C. Barty, S. Betts, D. J. Gibson, F. V. Hartemann, J. Hernandez, M. Johnson, **I. Jovanovic**, D. McNabb, M. Messerly, J. Pruet, C. Siders, and A. M. Tremaine, "Fiber-Based, Spatially and Temporally Shaped Picosecond UV Laser for Advanced RF Gun Applications," Particle Accelerator Conference, Albuquerque, New Mexico, June 25-29, 2007

M. Shverdin, **I. Jovanovic**, D. Gibson, F. Hartemann, C. Brown, S. Anderson, S. Betts, J. Hernandez, M. Johnson, M. Messerly, J. Pruet, A. Tremaine, D. McNabb, J. Gronberg, C. Siders, and C. P. J. Barty, "High Power Picosecond Laser Pulse Recirculation," POSIPOL 2007 Workshop, Orsay, France, May 23-25, 2007

I. Jovanovic, C. Brown, C. Haefner, M. Shverdin, M. Taranowski, and C. P. J. Barty. "High-dynamic-range, 200-ps window, single-shot cross-correlator for ultrahigh intensity laser characterization," Conference on Lasers and Electro-Optics, Baltimore, Maryland, May 6-11, 2007

D. P. McNabb, C.P.J Barty, F.V. Hartemann, J. Pruet, S.G. Anderson, P.D. Barnes, D.J. Gibson, C.A. Hagmann, J.E. Hernandez, M.S. Johnson, **I. Jovanovic**, M. J. Messerly, E.B. Norman, M.Y. Shverdin, C.W. Siders, A.M. Tremaine, W. Bertozzi, R. Hasty, S.E. Korbly, R.J. Ledoux, and W.H. Park, "Mapping isotopic distributions inside enclosures with Thomson-backscatter sources to detect SNM and its configuration", International Conference on Nuclear Data for Science and Technology, Nice, France, April 22-27, 2007

F. V. Hartemann, S. G. Anderson, C. Barty, D. J. Gibson, C. Hagmann, M. Johnson, I. **Jovanovic**, D. McNabb, M. Messerly, J. Pruet, M. Shverdin, C. Siders, and A. M. Tremaine, "Gamma-Ray Compton Light Source Development at LLNL," APS March Meeting, Denver, Colorado, March 5-9, 2007.

A. **Bougaev**, A. Urmanov, **L. Tsoukalas**, K. Gross "Method of Key Vectors Extraction Using R-Cloud Classifiers" New Mathematics and Natural Computation, Vol 3 No. 3 (2007) 1-8, World Scientific Publishing Company

V. Agarwal, **L. Tsoukalas** "Denoising Electrical Signal via Empirical Mode Decomposition" Bulk Power System Dynamics and Control—VII, August 19-24, 2007, Charleston, South Carolina

R. Gao, **L. Tsoukalas**, "Implementing Virtual Buffer for Electric Power Grids" International Symposium on Symbiotic Nuclear Power Systems for 21st Century (ISSNP) July 9-11, 2007; Fukui Prefectural Wakasa Wan Energy Research Center, Tsuruga, Fukui, Japan

R. Gao, **L. Tsoukalas**, "Intelligent Prognostics Methodology for Predicting Aging Effects in Nuclear Systems" International Symposium on Symbiotic Nuclear Power Systems for 21st Century (ISSNP) July 9-11, 2007; Fukui Prefectural Wakasa Wan Energy Research Center, Tsuruga, Fukui, Japan

Manuel L. Szejnberg Gonçalves-Carralves and **Tatjana Jevremovic**, "Numerical assessment of radiation binary targeted therapy for HER-2 positive breast cancers: advanced calculations and radiation dosimetry", *Phys. Med. Biol.* 52 No 14 (21 July 2007) 4245-4264

Book Contributions



C. Haefner, **I. Jovanovic**, B. Wattellier, and C. P. J. Barty, “Demonstration of pulse switching with $>10^{11}$ prepulse contrast by optical parametric amplification”, in Ultrafast Optics V, Springer Verlag, in press (2007).

M. Ishii and **T. Hibiki**, Thermo-fluid Dynamics of Two-phase Flow, Springer, 2nd print (2006).



Seminars/Workshops/Lectures

Tatjana Jevremovic, **Advancing the Idea of BNCT for Metastatic Cancers**
Cancer Research Clinical Partnership program, Oncological Sciences Center, Discovery Park, (September, 5, 2007)



FYI

We are updating the photos on the bulletin board outside of the main office. Kellie Reece, Departmental Secretary will email times so faculty, staff and students can get their pictures taken.

New location of Business Office and Student Services: The Business Office is located in room 132B and Student Services is located in room 136

Calendar



August

- 13th—First day for faculty
- 15th—Faculty Meeting – 3:30 p.m. Conference Room
- 17th—Dean Open Forum – 3:30 p.m. STEW 206
- 20th—Fall classes begin
- 22nd—Colloquium (Joint) – Welcome (Bralts) – 3:30 p.m. WTHR 200
- 29th—Colloquium - TBA

September

- 3rd—Holiday
- 5th—Faculty Meeting – 3:30 p.m. Conference Room (Dean Jamieson)
- 12th—Colloquium – TBA
- 12th—Dean Open Forum – 3:30 p.m. POTR 234
- 15th—PU Family Day (Set up on mall – Need 1 faculty & 1-2 students)
- 19th—Colloquium – TBA
- 23rd, 24th Big 10 + Graduate School Expo (Need 1 faculty & 1 student)
- 26th—Colloquium – TBA

October

- 3rd—Faculty Meeting – 3:30 p.m. Conference Room
- 8th, 9th—October Break
- 10th—Colloquium – TBA
- 17th—Colloquium – TBA
- 18th—Dean Open Forum – 11:30 a.m. TBA
- 24th—Colloquium – TBA
- 27th—PU Homecoming (Set up on mall – need 1 faculty & 1-2 students)
- 29th—ABET Review
- 30th—ABET Review
- 31st—Colloquium – TBA

November

- 7th—Faculty Meeting - 3:30 p.m. Conference Room
- 4th—Colloquium – TBA
- 21st, 24th – Student holiday break
- 22nd, 23rd—Holiday
- 28th—Colloquium – TBA

December

- 5th—Faculty Meeting - 3:30 p.m. Conference Room
- 6th—Dean Open Forum– 3:00 p.m. STEW 202
- 10th—15th Final Exam Week
- 14th—NE Graduation Reception
- 16th—Fall Commencement
- 24th, 25th, 31st—Holiday