

MSE Newsletter



Graduate Student Admissions: Please notify your colleagues and associates that the deadline for graduate student applications for fall enrollment in MSE is **February 1, 2015**. In certain circumstances, we may accept slightly late applications, particularly from domestic students. We look forward to receiving many applications from outstanding students around the country and the world, who have interest in pursuing their Ph.D. degrees in MSE here at UT. Kurt Sickafus, MSE Department Head

Graduate Students from the Kyushu Institute of Technology visit UT-MSE (by Kurt Sickafus)

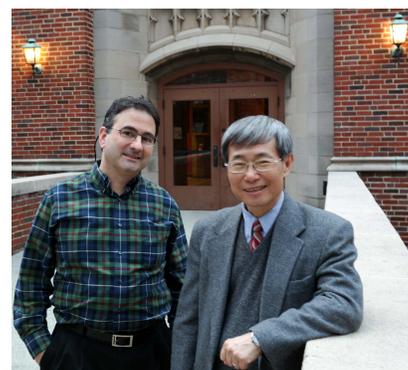
This month, we have been honored to host a visit by two graduate students from the Department of Materials Science and Engineering (MSE) at the Kyushu Institute of Technology (also known as Kyutech), Fukuoka, Japan (<http://www.kyutech.ac.jp/english/about/>). The students are Mr. Kazuki Watanabe and Mr. Kenta Imada, both first year Masters degree candidates in MSE at Kyutech. Both Kazuki and Kenta earned their Bachelor of Engineering degrees at Kyutech last year. Their Masters degree advisor is Professor Manabu Ishimaru, who recently moved from Osaka University to Kyutech. Manabu is an expert in transmission electron microscopy and radiation damage effects in semiconductors and insulators. Both Kazuki and Kenta are at UT this month to perform ion beam irradiation experiments in the Ion Beam Materials Laboratory (IBML), a new facility developed as a research partnership between UT and Oak Ridge National Laboratory (<http://ibml.utk.edu/>). Kazuki and Kenta's ion irradiation experiments are being performed in collaboration with Professors Bill Weber and Yanwen Zhang, who direct the research at the IBML. Kazuki is performing germanium (Ge) ion irradiations on amorphous Ge targets, to better understand radiation-induced atomic disordering phenomena. Kenta is performing gold (Au) ion irradiation experiments on nano-structured thin films of silicon carbide (SiC). He is interested in radiation-induced amorphization of nanophase materials. Kazuki and Kenta visit UT from January 8 – February 4.

Mr. Louis (Lou) Santodonato and Professor Peter Liaw publish research in *Nature Communications*. (by Kurt Sickafus)

MSE Ph.D. candidate, Louis Santodonato, and his thesis advisor, MSE Professor Peter Liaw, recently published a paper in the prestigious journal, *Nature Communications*:

Santodonato LJ, Zhang Y, Feyngenson M, Parish CM, Gao MC, Weber RJK, Neuefeind JC, Tang Z, Liaw PK. Deviation from high-entropy configurations in the atomic distributions of a multi-principal-element alloy. *Nat Commun* 2015; 6 (DOI: <http://dx.doi.org/10.1038/ncomms6964>).

This full-length article by Louis Santodonato and colleagues tells the story of a uniquely complex class of metallic materials that have come to be known as *high-entropy alloys*. High entropy alloys are compositionally fascinating because they are composed of intimate mixtures of five or more elements, all in high concentrations (the model alloy discussed by Santodonato *et al.* is $Al_{1.3}CoCrCuFeNi$). These alloys are structurally interesting because so many elements lead to highly complex atomic mixing and un-mixing behaviors, as these alloys are solidified from the melt. Louis and his colleagues used complementary neutron and X-ray synchrotron scattering techniques to measure multiple ordering parameters in high-entropy alloys over a wide range of temperatures. They also employed theoretical atomistic simulation techniques to reveal local ordering trends in the liquid states of these alloys. This work is important because it is anticipated that high-entropy alloys will possess exceptional properties in engineering applications (high strength at high temperatures, ductility, toughness, corrosion resistance, etc.).



Louis (Lou) Santodonato (left) and Peter Liaw (right) in front of the Ferris Engineering Building, home to the Materials Science and Engineering department at UT.

Coming Events: Graduate Student Seminar Series, Dr. Paras Prasad, Distinguished Professor, SUNY-Buffalo 2pm Friday, January 30, 2015, 307 SERF.

Donations: Please consider giving to our academic program in the Materials Science & Engr. Dept. at UT.

For more information about UT-MSE, visit our website:

UT-MSE Homepage: <http://www.engr.utk.edu/mse/index.php>

