Facilities supervisor supports on-campus, sustainable measures

By Brock Auerbach-Lynn
TECHNEWS WRITER

Ever wonder how IIT keeps its walkable areas clear of snow in an environmentally friendly fashion? Or how the new composter works? The Office of Campus Energy and Sustainability (OCES) sat down with John Wachowski (JW), Field Operations and Warehouse Supervisor for IIT's Facilities Department, to answer some questions about how recent changes are pushing IIT in a more sustainable direction.

OCES: How have you brought a holistic approach to sustainability in everyday operations?

JW: I approach every task with the idea of reducing waste and improving our environmental, health and safety standards. IIT's trash management is our biggest issue and greatest opportunity. Too much time was being spent on trash can maintenance during our crew's daily routine—the bags were falling apart and workers complained that bins often contained sharp objects that could puncture the skin. So, we decided to replace the bags with dump-able plastic containers [a garbage can within a garbage can] so the crew never have to touch plastic bags/garbage directly. Now, we have fewer safety incidents and it saves our crew 8-11 hours as well as 500+ plastic bags each week.

OCES: How has the grounds crew changed snow removal operations?

JW: When I first started in 2011, there was a good amount of damage due to plowing and salt/snow removal which takes a lot of time and money to repair. I've previously been exposed to a product called Maximum Salt as an alternative to using calcium chloride (traditional rock salt) for snow management. Maximum Salt is a beet juice derivative (made of sugars from beets (farmed using renewable technologies) as well as beet juice combined with salt brine), making it a 100% biodegradable, pre-treatment deicer agent. We simply pre-treat surfaces before any snow falls and let it do its work. Unlike calcium chloride, Maximum Salt reduces snow build-up, resulting in fewer pools of water and thus fewer dirty, wet footprints everywhere—not to mention fewer slipping incidents.

OCES: How does the grounds crew feel about this new product?

JW: They were initially concerned with potential safety concerns, since it's a liquid and much different than traditional rock salt. Many couldn't believe it was just beet juice and how easy it was to use. They previously had a lot of health-related issues with the calcium chloride from breathing it in, getting it on their hands and clothes, etc. The beet juice product is completely washable, doesn't stain and poses no health concerns.

OCES: What's the future for snow removal on IIT grounds?

JW: We're only currently using the Maximum Salt on areas to prevent grass damage, so areas, including parking lots and Wabash Ave. and Federal St., are still using the calcium chloride. We are aiming to get Maximum Salt in larger, bulk quantities for the deicing trucks, so that we can use it on parking lots as well. Right now, it's too costly for the trucks, so we're confined to spreading it manually.

Another snow removal improvement is a winter shift-change. We currently have crews working Sunday through Thursday to cover our entire week's needs. IIT accommodates CPS testing and church services on the weekends, so we pre-treat those areas on Thursdays and re-check on Sunday—preventing unnecessary overtime. Switching to a Sunday start date gives us more time to prepare for the coming work week, instead of rushing to start on Monday mornings.

OCES: IIT recently acquired a composter for which grounds has been the primary caretaker. Is this your first time working with one?

JW: Yes. When we first got the composter, we thought it was just a "food" composter. It actually requires wood and soil to be mixed in as well. Its implementation was a learning experience for all of us. To get the required wood chips, I contacted Brickman, a regular landscaping contractor, who offered us two truckloads, which they would normally have disposed of. We are also using sawdust from the [Materials and] Metals Building. We now put about two-cubic-yards a week towards a productive end, instead of landfilling.

This past summer, we pruned many of IIT's trees, giving us an ample wood supply for the coming composter-season [non-winter weather]. What we need now is a wood chipper, to make our own chips from these branches. Till date, we have saved over twenty 40-yard dumpsters by re-using wood, sawdust and wood chips. Next summer, we'd like to grind our own wood chips. This is consistent with our goal of becoming an internally-sustainable grounds operation. The compost now uses food, wood and saw dust that is all internally acquired and can be used for the proposed student-run vegetable garden.

OCES: What's the schedule of composter operations?

JW: We shut it down over the winter break, as there are no students and no food waste. We also have storage issues, since there is not enough land to store compost on. We tried using bags and leaving them aside, but discovered later that the compost became unusable. We aren't sure exactly why this happened, though we suspect it's due to everything in the compost being completely natural and containing no preservatives.

OCES: What's your compost recipe?

JW: Two parts wood, one part food. A 23-gallon container is used to cover one yard of land. Normally, during a Monday-Friday operation, we use six 23-gallon containers of wood (one of which is top soil we use to darken the compost) and three 23-gallon contains of food (brought in by Sodexo).

OCES: Who determined these measurements?

JW: We did through trial and experience. We weren't given a formula, so we tried various methods to see what worked. There was a learning curve for everyone involved. The grounds crew was adding wood, dirt and pre-consumer food [food disposed of from the kitchen prior to student-handling]. The issues with post-consumer food are the inclusion of non-compostable plastic utensils that can damage the composter. The food students dispose of in the organic slot on the Hawk bins still gets composted, but at the Waste Management site, not on IIT grounds.

We estimate that this year alone, we've saved over $7,000 in dumpster costs and 800-yards of waste. We are hoping to re-invest the money saved into the wood chipper we want. Considering we didn't pay for the composter, we'd say these are good savings. Also, if you consider the wider "gate-to-grave" impact of food disposal, composting substantially reduces IIT's environmental impact.

OCES: What else is in store for IIT grounds?

JW: We hope to take over IIT's flower and plant management and shift to planting more perennials to reduce maintenance and save money. We'd also like to get up-to-speed on the composter, to maximize our time using it. Ideally, we want to take advantage of the mild winter we're having and start composting in March, as opposed to April.

OCES: Anything else you'd like to add?

JW: If students have suggestions, ideas or questions, they can email me at jwachows@iit.edu

OCES would like to thank John Wachowski for taking the time to answer our questions and his entire department for their continued efforts.

FAFSAs turned in on-time, early reap benefits

By IIT Office of Financial Aid

The Office of Financial Aid would like to encourage students who have not completed the Free Application for Federal Student Aid (FAFSA) for the 2012-13 academic year to do so immediately. The FAFSA is available to U.S. citizens and permanent residents. Below are some important tips on FAFSA completion and the importance of finishing a FAFSA promptly.

The priority deadline for FAFSA completion is March 15.

Even if your or your parents' tax return is not completed for 2011, families can use an estimate of their 2011 income to complete the FAFSA. Corrections to the FAFSA can be made later once taxes are filed.

Please note: Missing the March 15 deadline does not guarantee additional coverage.

If your FAFSA is not received by March 15 and you are not eligible for federal or state aid as a result, our office cannot necessarily offer additional assistance. Since some forms of federal and state aid are extremely limited and run out at some point, it is important to always complete the FAFSA soon after it becomes available each year (January 1 for the upcoming year).

Use the IRS data retrieval tool.

Some families who have filed their taxes may also be able to utilize the IRS data retrieval tool on the FAFSA. This tool allows eligible families to pull their tax information directly from the IRS to the FAFSA instead of manually entering each item. This tool became available February 1 from the IRS.

Once we receive your FAFSA, we will put together a financial aid package for you for the 2012-13 year. If any documents are requested by the Department of Education, we will also notify you at that time. Our goal is to avoid changes and last minute delays as much as possible to better serve students and offer award assistance as soon as possible. As always, please feel free to contact the office with any questions at finaid@iit.edu or 312.567.7219.

Colloquia series continue in Applied Math, Physics Departments

By Swasti Khuntia
LAYOUT EDITOR

The Applied Math Department at IIT hosted two colloquia last week. The first colloquium was organized on Monday, March 5, on "Time Scale of Dynamic Networks" by Ms. Rajmonda Sulo Caceres, PhD candidate in Laboratory for Computational Population Biology at University of Illinois, Chicago. She discussed possible formalizations of the problem of identifying inherent time scales of interactions and presented some initial approaches in solving it, noting the advantages and limitations of these approaches.

Interactions, either of molecules or people, are inherently dynamic, changing with time and context. Interactions have an inherent rhythm, often happening over a range of time scales. Temporal streams of interactions are commonly aggregated into dynamic networks for temporal analysis. Results of this analysis are greatly affected by the resolution at which the original data are aggregated. The mismatch between the inherent temporal scale of the underlying process and that at which the analysis is performed can obscure important insights and lead to wrong conclusions.

In the talk, Ms. Caceres described the challenge of identifying the range of inherent temporal scales of a stream of interactions and of finding the dynamic network representation that matches those scales. At the end, she emphasized that this is a nascent area of research and the goal is to highlight its importance and to establish a computational foundation for further investigations.

Another Math Department colloquium was organized on Wednesday, March 7, the topic being "Treecode - Accelerated Boundary Integral Poisson-Boltzman Solver". The lecture was delivered by Dr. Weihau Geng, Assistant Professor, Department of Mathematics at University of Alabama.

Starting with topic of solvation, he said how solvation of biomolecules is a challenging problem in computational biophysics. And, models that track explicit solvent molecules are extremely costly, and implicit solvent models based on the Poisson-Boltzmann (PB) equation provide an efficient alternative for computing solvent-solute interactions.

Even so, PB solvers still encounter numerical difficulties stemming from the discontinuous dielectric constant across the molecular surface, the boundary condition at spatial infinity, and the presence of charge singularities representing the biomolecule. To address these issues, Dr. Geng and his research group had developed a linear PB solver employing a well-conditioned boundary integral formulation and GMRES iteration accelerated by a treecode algorithm.

The accuracy and efficiency of the method were assessed for the Kirkwood sphere and a solvated protein (PDB:1A63). Then, they compare numerical results for both the Poisson-Boltzmann and Poisson equations, using the proposed treecode-accelerated boundary integral solver, as well as the mesh-based Adaptive Poisson-Boltzmann (APBS) method.Finally, he found out how the present scheme has the features of relatively simple implementation, efficient memory usage, and straightforward parallelization.

On Thursday, March 8, the Physics Department organized an interesting colloquium on "Geophysics of Fractures". The talk was delivered by Dr. Laura Pyrak-Nolte, Professor, Department of Physics and Department of Earth and Atmospheric Sciences, School of Civil Engineering, Purdue University.

In the talk, she presented experimental data from several experiments that have advanced our understanding of the effect of the relevant length scales that are important for interpreting fracture properties from geophysical measurements. She stated that societal interactions with the subsurface include a range of activities from construction of subsurface infrastructure such as tunnels to the storage of anthropogenic byproducts in subsurface reservoirs.

Common to all such sites are mechanical discontinuities that span scales over several orders of magnitude that are often perturbed by natural and/or induced processes associated with the subsurface project. Dr. Nolte emphasized how basic understanding of the effect of length scales on the interpretation of geophysical data from fractures or fractured systems is required for site characterization and long term monitoring of large-scale subsurface projects.

At the end, she discussed the four different seismic imaging methods in the laboratory to characterize fractures and alteration to fractures through four dynamic processes: the first being wavefront imaging provides images of the isotropy or anisotropy of a medium as well as energy partitioning into converted modes, guided waves and interface waves and focusing by fractures; the second is acoustic-mapping mode (C-scan) provides a detailed map of the variations in sample properties; the third being acoustic-lens mode provides data to determine the role that scattering plays in interpreting seismic data from fractures containing spatially-correlated or uncorrelated aperture distributions; and finally a seismic array mode provides the change in seismic attributes from dynamic processes.