As we say goodbye to the INTEGRATE Project, from now on this newsletter will be dedicated to topics related to the RENEW Program. Several students and post-docs that started on INTEGRATE have now migrated to RENEW.

Great achievements have been made with the INTEGRATE project. As the Ministry of Research and Innovation puts out a call for Round 9 of the ORF - Research Excellence, we wish our PIs luck with a new application, and hope that they can start INTEGRATE 2.0 soon. The technological advancement observed within the 5 years of INTEGRATE certainly deserves more funding to further develop applications of electrokinetics, nanometal solutions, STAR, and many others in the realm of groundwater remediation.

Over the past year, pilot and full scale applications of STAR, nanometal formulations, and electrokinetics have been performed. These field tests puts our Ontario-based research in the forefront of scientific advancement, employment, and economic development. Our researchers and their collaboration with the industry have become internationally recognized as the reference in the development and application of groundwater remediation technologies.

In this issue, our featured student is Sabina Rakhimbekova and she tells us of her experience during her International Exchange at the University of New South Wales in Sydney, Australia.

Pulin Mondal, the new Program Coordinator for RENEW, tells us a bit about himself and his research with Professor Brent Sleep.

We also bring you a list of “Where are They Now?” to find out what our former INTEGRATE students and postdocs have been up to.

Enjoy!

Cover Photos: INTEGRATE and RENEW in action: From top: RENEW trainees at Field School UWaterloo 2017; Gavin pulling an all-nighter at sometime in 2015; Lais with Prof. Tsourlos at the NJ Field Site; Cole at a gas storage site somewhere in Texas in 2017; Ariel doing God knows what at the Field School, April or May 2017; Chris sampling in the field in 2015; the EK team at their field test in 2016; Professor Sleep and his graduate students having some fun in the lab; Professor Edwards and her graduate students.
Do you come from a land down under?

*by Sabina Rakhibenkova*

Do you come from a land down under?  
Where women glow and men plunder?  
Can’t you hear, can’t you hear the thunder?  
You better run, you better take cover.  
 *(Men at Work)*

This winter the RENEW Program provided me with an excellent opportunity to participate in a research practicum at the Water Research Lab (WRL) at the University of New South Wales in Sydney, Australia.

The project team at WRL at Manly Vale has modelling and large scale testing facilities where university professors in partnership with industry experts tackle the most challenging and stressing water related problems. One of the main priorities in Australia is preservation of its coastline, which

Close and personal with this guy!

With Professors Denis O’Carroll and Martin Andersen in front of one of Sabina’s research subject: a beach!

Sabina in the field with Professor Andersen.
has immeasurable economic, natural and cultural values. With climate change, shoreline erosion is becoming a stressing issue and a special research team at WRL is exploring different techniques and methods to monitor and predict local stressors and shoreline variability. A lot of attention in Australia is dedicated to extreme weather events such as storms and flooding, that might be particularly damaging in the framework of climate change. For example, WRL researchers were able to predict and capture the impact of a coastal storm which led to the erosion of 50 meters of local beach in Sydney in June 2016.

Their research also focuses on testing vehicle stability in the event of major flooding, addressing the increase in fatalities in four-wheel drive (4WD) vehicles operating during the storm events. Large facilities allow researchers to perform large scale laboratory testing and investigate the hydraulic structures under different scenarios applying principles of civil engineering hydraulics. In addition to learning about different research that is being done at WRL, I had a chance to work closely with the research team that focuses on groundwater, a theme that is more familiar for me. I joined them in their research meetings and several field trips. Australia has a very distinct nature and therefore working in the field there is a very nice experience. For example, one of the study sites represents a very unique environment, where the aquifer is bound by the ocean from one side and a wetland from the other.

While at WRL, I had the opportunity to work on numerical modelling and analysis of my thesis data, and got valuable feedback from my host Dr. Martin Andersen. Dr. Andersen has a profound experience in geochemical modelling. I also learnt new field techniques that will be valuable for future field work as my research is largely field based.

Finally, while I was there, I had the pleasure to witness the opening of Dr. Denis O’Carroll’s lab at WRL, where he plans to continue his research on use of iron nanoparticles for remediation purposes as well as investigating the fate of newly emerging nanoparticles in the environment. Dr. O’Carroll is my co-supervisor and has recently moved to Australia. It was very nice to see his success pushing groundwater and remediation research at WRL, which currently has more structural and civil engineering emphasis.

I am very thankful for all the support Dr. O’Carroll has provided me during my stay in Sydney and for the funding provided by the RENEW Program, which made this invaluable experience financially feasible.
petroleum hydrocarbons; thermal remediation of contaminated soils; transverse dispersivity of solute at the soil media interfaces; NAPL mobility is porous media. With various projects, Pulin has closely worked in collaboration with the Chevron Energy Company, ARCADIS Canada, Pinchin Environmental Ltd., and Forewater Solutions.

Pulin has taught both undergraduate and graduate civil and environmental engineering courses. He has worked a Sessional Lecturer for an undergraduate course, Groundwater Flow and Contamination (in Fall 2016 and 2011) and a graduate course, Analysis of Water and Waste (in Fall 2012) at UofT. He also worked as a Lecturer for several undergraduate courses at the Dhaka University of Engineering and Technology and the Chittagong University of Engineering and Technology (Bangladesh). Over the years, Pulin has supervised, trained, and mentored many graduate and undergraduate students with their research projects. His professional service activities include being a technical examiner and examination reviewer for the Professional Engineers Ontario (for Hydrogeology and Contaminant Hydrogeology national examinations) and reviewer for several scientific journals, serving as an elected graduate student representative and a young professional committee member of the Ontario Water Works Association. In addition, he has been involved with various outreach activities of the Groundwater Lab (UofT).

**Updated Publications**


**Where are they now?**

Our INTEGRATE and RENEW HQP has spread through Canada and the world. What some of our former students and even one PI are doing now?

**A** few are now Professors at the following Universities:

- Magdalena Krol - York
- Erica Pensini - Guelph
- Amalia Kokkinaki - San Francisco, USA
- Tanzeer Hasan - Dhaka, Bangladesh
- Rory Hadden - Edinburgh
- Denis O’Carroll - New South Wales

Others are on Research Associate positions:

- Pulin Mondal - UofT
- Paolo Pironi - Edinburgh
- Bahngmi Jung - Texas A&M at Qatar
- Jorge Dominguez - Western

Others are engineers and scientists at consulting companies or research institutes:

- Cjestmir de Boer - TNO, The Netherlands
- Ziheng Wang - Perrigo, Allegan, MI
- Michael Previdis - Savron – Geosyntec
- Gavin Overbeek – AEL Environmental
- Rebecca Solinger - Geosyntec
- Cody Murray - Savron – Geosyntec
- Laura Kinsman - Savron – Geosyntec
- Mehrnoosh Ebrahimzadeh - Rente lmik
- Grant Scholes - Savron – Geosyntec
- Dennis Hsu - AMEC Foster Wheeler
- Fan Yang - Aquanty
- Nicole Soucy - Houle Chevrierin, Ottawa
- Obai Mohammed - MOECC Kingston

Other are pursuing PhDs or Postdoc Fellowships:

- Ahmed Chowdhury - somewhere in Bangladesh
- Omneya Elharkoumy - PDF - Queen’s
- Ariel Garcia - PhD - Western
- Chris Kocur - PDF - OHSU
- Fei Luo - PDF - UofT
- Silvia Zarate Munoz - PDF - UofT
- Tarek Rashwan - PhD - Western
- Madha Salman - PhD - Western
- Bruce Xu - PDF - UofT

**A few testimonials:**

“The Integrate meetings that I attended as a graduate student were very important to my professional development. Discussions with the other PIs gave me excellent perspective on my own research and interactions with industry partners helped me build a network of contacts. The meetings and interactions within Integrate allowed me to work with researchers from other institutions and learn about the work going on around the province.”

“Finally, I would like to take this opportunity to give Glauca a great credit for all the efforts with the group members, and a huge thank to her from my side to acknowledge her support to me all the way through since I joined the PhD program.”

“I’ve spent 4.5 years with INTEGRATE ORF Project, during which I’ve honed my professional skills, with tremendous knowledge on nZVI remediation technology and gases nature and effects in the subsurface, proved by a submitted WRR journal paper, a second paper ready to submit very soon, and a third paper pending finalizing the last laboratory experiment. During the previous time, I’ve built and obtained great connections with industrial experts as well as government personnel who are active in the subsurface contamination and remediation field. I’m pretty confident that the knowledge, skills and connections I’ve established being part of this great project would put me in the right track at this final stage of my PhD looking for a future career.”

**Where are they now?**

Six RENEW students spent 3 weeks over April and May at the University of Waterloo Field School working under sun and rain (more rain than sun actually) to learn important field techniques in hydrogeology. They were Alexander Stevenson, Ariel Nunez Garcia, Nicholas Head, Charlie Xu Chen, Suzana Kraus, and Ainsley Inglis. The shared their Airbnb with Hayley Wallace and Salman Sabahi.

**Where are they now?**

Obai Mohammed, M.Sc., P.Eng., PMP
Ph.D. Candidate | Queen’s University

Obai is working at the MOECC in Kingston!

“I have greatly valued the opportunities offered by the INTEGRATE project. This program fostered a great sense of community among researchers from the participating institutions, and opened doors for deeper collaboration with industry partners. It has been a tremendous experience.”

**Where are they now?**

Tarek Rashwan
PhD Candidate
Western University

“Dr. Chris Kocur
Post Doctoral Fellow
at Oregon Health & Science University

My current job as a post-doc researcher at OHSU stemmed from talks that occurred at an Integrate Meeting in Toronto back in 2015.”

**Where are they now?**

Dr. Chris Kocur
Post Doctoral Fellow
at Oregon Health & Science University

“I’ve spent 4.5 years with INTEGRATE ORF Project, during which I’ve honed my professional skills, with tremendous knowledge on nZVI remediation technology and gases nature and effects in the subsurface, proved by a submitted WRR journal paper, a second paper ready to submit very soon, and a third paper pending finalizing the last laboratory experiment. During the previous time, I’ve built and obtained great connections with industrial experts as well as government personnel who are active in the subsurface contamination and remediation field. I’m pretty confident that the knowledge, skills and connections I’ve established being part of this great project would put me in the right track at this final stage of my PhD looking for a future career.”
Congratulations to Gavin Overbeeke for his Master’s defense at Western University, and to Omneya Elsharnouby for her new position as PDF at Queen’s University.

We also would like to say goodbye to Ahmed Chowdhury as he moves back to Bangladesh, and wish him luck on his new endeavors.

This year’s RENEW Annual Meeting will take place at Queen’s University. The meeting will be at the Donald Gordon Conference Centre on November 2nd 2017. Please save the date.

Another important date: all RENEW trainees and all graduate students in the research programs associated with RENEW are invited to stay in Kingston the day after the annual meeting, on November 3rd 2017, for a full day workshop on Leadership, Engineering Communications, and more. Agenda, facilitators, and all details will be announced soon.

If you would like to write a contribution to our newsletter, please contact Glaucia (glaucia.lima@utoronto.ca) with your proposed text. All are welcome to contribute.

Acknowledgements

To Sabina and Pulin for their contributions, and to Tarek, Chris and Obai for their testimonials regarding the INTEGRATE Project. Also, to Dr. Ming Wu and Cole Van de Ven for some of the cover photos.