A MIGSAA Student's Research Activity Profile – Razvan Mosincat

Razvan Mosincat is a third year MIGSAA PhD student working on a PhD in Global-in-time dynamics for the derivative nonlinear Schrodinger equation. His supervisors are Tadahiro (Hiro) Oh (University of Edinburgh) and Oana Pocovnicu (Heriot-Watt University).


Razvan joined MIGSAA in 2014 with an interest to pursue his Ph.D. studies in the analysis of partial differential equations (PDEs), in particular, the so-called nonlinear dispersive PDEs. Prior to coming to Edinburgh, he was a master's student at the University of California, San Diego, USA, where he had his first exposure to the study of nonlinear dispersive PDEs, and before that he was an undergraduate in Timisoira, Romania. After arriving in Edinburgh, he started having a weekly reading seminar with faculty member Dr. Tadahiro Oh (Edinburgh) who eventually became Razvan's Ph.D. advisor. In the autumn of his first year, Razvan read several recent research papers in detail under the guidance of Dr. Oh and this led to a short joint paper,

R. Mosincat, T. Oh, A remark on global well-posedness of the derivative nonlinear Schrödinger equation on the circle, C. R. Math. Acad. Sci. Paris. 353 (2015), no. 9, 837--841.

In the spring semester, he continued to study the subject and as his MIGSAA extended project, he chose to explore more directions on related topics.

Razvan said "It is a very dynamic field of mathematics - substantial results pertaining to it appear every week on arXiv, frequent workshops and meetings in the community are, by now, known well in advance. As a student, getting up to date with what has been recently done and more importantly with what is relevant to study and occupy one's time with can be a tumultuous
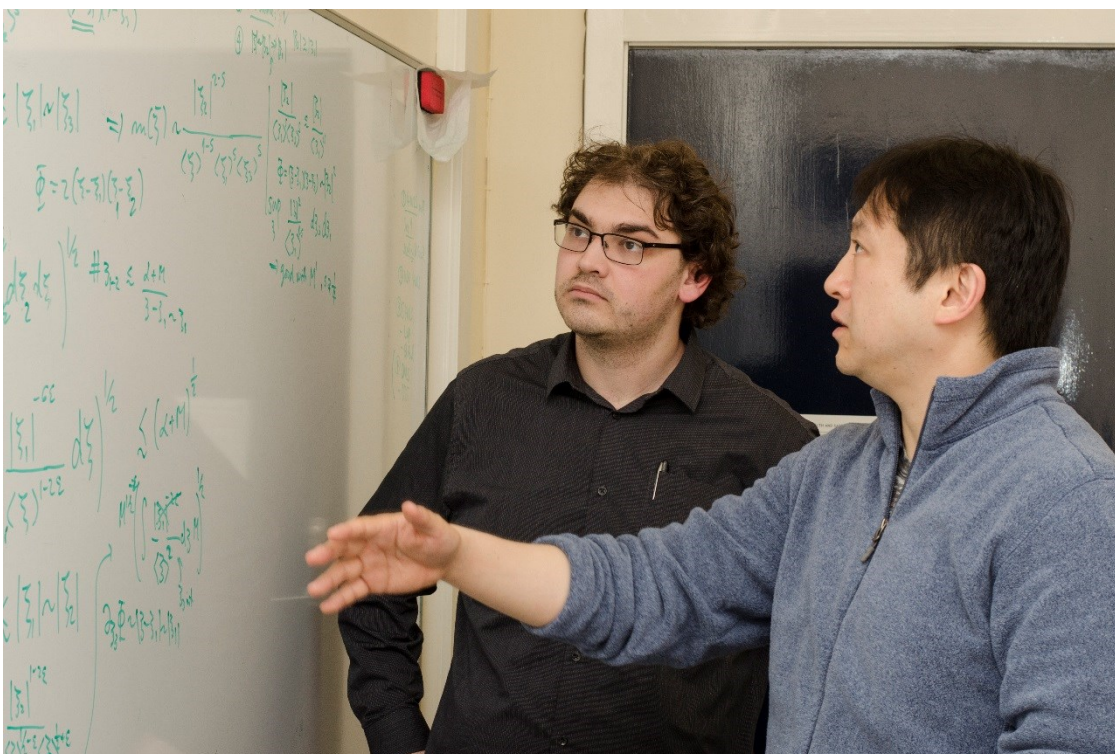
experience. And so, having someone providing effective guidance is essential to diminishing the feeling of being lost in the woods. Hiro does a fantastic job at this and at quickly settling my questions."

Regarding his immersion into the MIGSAA group, Razvan recounts "I found the first year to have just the right amount of group work and it had me quickly familiar with colleagues and places in and around Edinburgh, while at the same time allowing quite generous opportunities to concentrate on an area to specialise into."

In the second year, he worked on his second paper in MIGSAA. At the same time, he joined the weekly reading group for the extended project of his younger MIGSAA colleagues, Leonardo Tolomeo and Kelvin Cheung. The reading group was organised by Dr. Oh and Dr. Pocovnicu (Heriot-Watt) and participated by Ph.D. students and researchers, where each of the participants took turns weekly in presenting details on the assigned reading material of the current research topic. Razvan found such meetings very useful: "It's great training in making sure you don't have gaps in your understanding; if there's a genuinely tricky step, it will get noticed. Somehow, during these meetings we get to know better what we've read and also each other. I am wondering: is it the synergetic effort put into trying to understand an intricate paper, or the questions fired at each other, or the tea time afterwards?" He also credits his development to Dr. Pocovnicu and a postdoctoral researcher Yuzhao Wang (Edinburgh): "I find my time spent with them very stimulating and I am grateful for the attention and support they are ready to provide every time."

While it took substantial effort, Razvan managed to finish his second paper in MIGSAA toward the end of his second year. During the preparation of the paper, he benefited from conversation not only with his advisor but also with other members in the Maxwell Institute. Once it was posted on the public electronic depository "arXiv", it was immediately noticed by several outside researchers. On the back of this he was invited to give a fifty-minute talk in Analysis Seminar at the University of Birmingham on the topic. This second paper is

R. Mosincat, Global well-posedness of the derivative nonlinear Schrödinger equation with periodic boundary condition in $H^{\frac{1}{2}}$, arXiv:1608.06838 [math.AP], 53 pages.

Razvan also enjoys the multitude of seminars, reading groups, and work- shops offered at the two universities and ICMS. He appreciates that MIGSAA encourages its students to pursue secondary interests in the idea of rounding up what is a highly specialized pursuit. "I became aware that in order to get perspectives into the larger field of PDEs, one has to get glimpses outside one's specialization. So, I really appreciate having access to various meetings in other branches beyond my own field," Razvan said. During the first two years of his P.h.D. study, he attended several summer schools and conferences: Warwick and Nantes (France) during his first year and Bonn (Germany) and Paris (France) during his second year. While Razvan was funded by the organisers to attend these meetings, some of the trips were covered by the MIGSAA travel fund and Dr. Laura Wisewell Travel Scholarship, an award given by the School of Mathematics at the University of Edinburgh for excellence in research. Razvan gratefully acknowledges this support as it enabled him to attend meetings important for his career development.