

**AARMS Report for Graph Searching in Canada Workshop
GRASCan 2016
July 20-21, 2016 at Dalhousie University**

Organizers: A. Bonato (Ryerson University) M.E. Messinger (Mount Allison University), J. Brown (Dalhousie University)

Report prepared by M.E. Messinger (MtA)

Description and Highlights

GRASCan 2016 was held July 20-21 at Dalhousie University, NS. Now in its fifth year, the workshop brought together researchers (both faculty and graduate students) in graph searching for two days of talks and collaboration. The workshop follows the model of plenary and contributed talks in the mornings, with the afternoons free for discussion, networking, and collaboration. To maintain an inclusive and collaborative atmosphere, the workshop is purposely kept small. Post-docs and graduate students are encouraged to attend, upon recommendation by their supervisors. This year, the workshop had 22 participants (listed on page 2). The workshop was made possible through generous funding from the Atlantic Association for Research in the Mathematical Sciences (AARMS), the Dalhousie University Dean of Science, and the Dalhousie University Mathematics and Statistics Department.

The plenary speakers were leading experts in graph searching problems: Geňa Hahn from l'Université de Montréal, QC and Paweł Prałat from Ryerson University, ON. The workshop also featured six contributed talks. The plenary and contributed talks generated interesting discussions and new ideas.

After the lunches, participants with existing collaborative projects retreated to quiet campus spaces to work (several additional spaces were booked for participants to use) while the remaining participants returned to Chase 319 (the main space for the workshop). There, small groups formed and participants shared ideas and some new research collaborations were born. Though there were many discussions and groups, and we mention several working groups below.

1. (On-going work) Danny Dyer (MUN), Jared Howell (MUN - Grenfell), and Boting Yang (Regina) worked on the late stages of an on-going project related to the watchman walk problem on Halin graphs.

2. (New Collaboration) Kerry Ojakian (Bronx) and Geňa Hahn (Montréal) discussed issues related to the game of infinite cops and robber; in particular, they discussed some issues related to a recent submitted paper of Hahn. After the discussion, they discussed the possibility of meeting soon to continue work.

3. (New Collaboration) Nancy Clarke (Acadia), Shannon Fitzpatrick (UPEI), M.E. Messinger (MtA), and R.J. Nowakowski (Dal) worked on some pursuit-evasion tunnel games as well as a new graph burning game. Some progress was made, with a plan for future work.

4. (New Collaboration) M.E. Messinger (MtA) and Jared Howell (MUN - Grenfell) began work on a new variation of chip-firing, where at each step, the vertices with maximum number of chips are fired simultaneously. The problem is inherently periodic (like parallel chip-firing and dislike the diffusion game). Preliminary results were found for paths and cycles.

5. (New Collaboration) C. Duffy (Dal), S. Seager (MSVU), K. Ojakian (Bronx) worked on the Diffusion Game, a variant of chip-firing. They focused on proving periodicity of paths for any finite initial chip configuration and obtained some partial results.

GRASCan 2016 Participants

The participants and their affiliations are listed below. Students and post-docs are indicated with *.

1. Anthony Bonato (Ryerson)
2. Margaret-Ellen Messinger (Mt.A)
3. Danielle Cox (MSVU)
4. Paweł Prałat (Ryerson)
5. Geña Hahn (Montréal)
6. Kerry Ojakian (Bronx)
7. Danny Dyer (MUN)
8. Shannon Fitzpatrick (UPEI)
9. Suzanne Seager (MSVU)
10. Nancy Clarke (Acadia)
11. Bert Hartnell (SMU)
12. Chris Duffy* (Dal)
13. Todd Mullen (Dal)
14. Jared Howell (MUN, Grenfell)
15. Ben Seamone (Montréal)
16. Richard Nowakowski (Dal)
17. Boting Yang (Regina)
18. Erin Meger* (Ryerson)
19. Jason Brown (Dal)
20. Elham Roshanbin* (Dal)
21. Melissa Huggan* (Dal)
22. Art Finbow (SMU)

Expenses

For the workshop, we received \$3000 from AARMS, \$1000 from the Dalhousie Dean of Science, and \$1000 from the Dalhousie Mathematics and Statistics Department.

Breakdown of expenses claimed from AARMS

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|---|-----------|
| Accommodations for plenary speaker Paweł Prałat | \$ 566.94 |
| Mileage for plenary speaker Paweł Prałat | \$ 788.04 |
| Airfare for plenary speaker Geňa Hahn | \$1600.00 |

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|--------------|------------------|
| Total | \$2954.98 |
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Breakdown of expenses claimed from the Dalhousie Mathematics and Statistics Department

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|---------------------------------|----------|
| Coffee Break (July 20) | \$144.61 |
| Coffee Break (July 21) | \$144.61 |
| Graduate Student Travel | \$425.00 |
| Graduate Student Accommodations | \$170.00 |

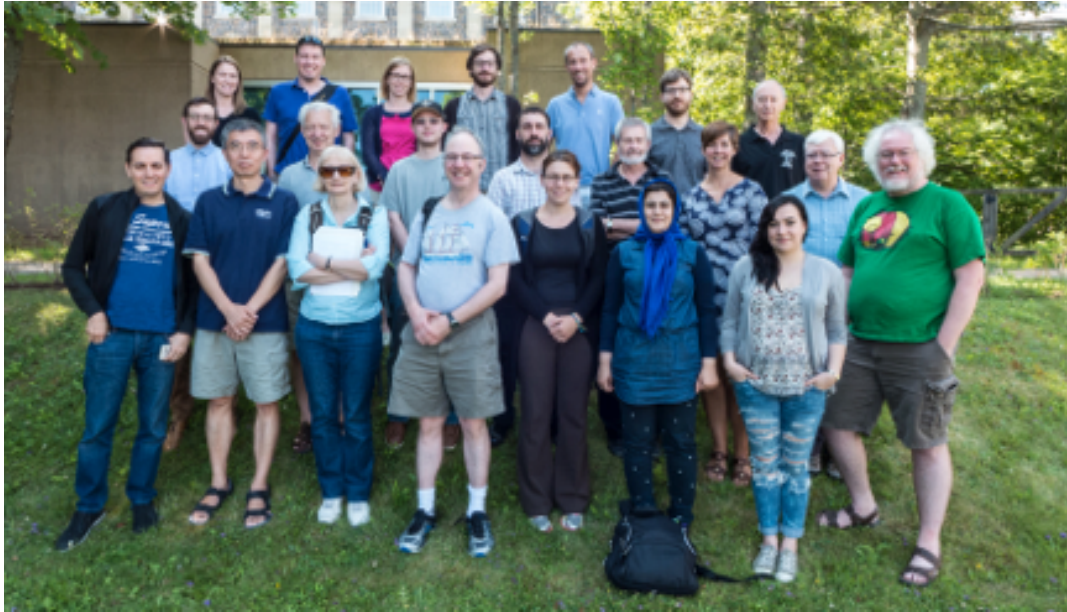
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| Total | \$884.22 |
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Breakdown of expenses claimed from the Dalhousie Dean of Science

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|-----------------|----------|
| Lunch (July 20) | \$320.83 |
| Lunch (July 21) | \$505.98 |

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|--------------|-----------------|
| Total | \$826.81 |
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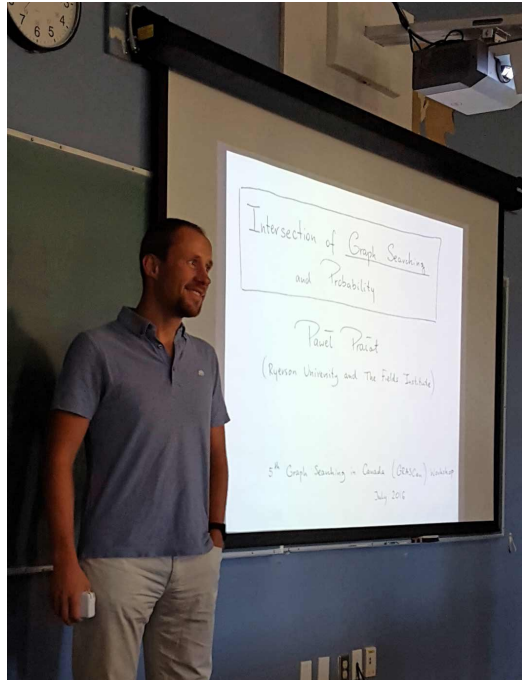
GRASCan 2016 Conference Photos



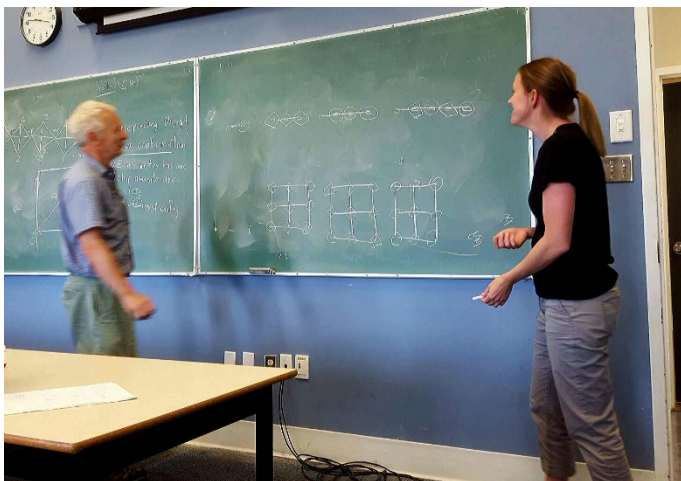
Group photo.



Plenary talk by Geňa Hahn.



Plenary talk by Paweł Prałat.



GRASCan participants at work and play.