

# Ademir-Paolo Vrolijk

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## EDUCATION

**Ph.D., Systems Engineering**—The George Washington University (GWU) 2022  
Engineering Management and Systems Engineering Department

- Dissertation: “*Towards a Better Understanding of Solving Complex Problems Through Innovation Contests*”
- Committee: Drs. Z. Szajnfarber (Advisor), E.L. Gralla, J.P. Deason, S. Pace, J.M. Falker
- Awarded First Place for the Cross-Disciplinary Research Prize (Graduate) of 2022—GWU Office of the Vice Provost for Research

**B.Eng., Aerospace Engineering: Structures, Systems, and Vehicle Design**—Carleton University 2008  
Department of Mechanical and Aerospace Engineering

## APPOINTMENTS

**Postdoctoral Fellow**—University of Toronto (U of T) 2022-prs.

- Supervise and mentor Ph.D. and undergraduate students conducting Engineering Design research. Write research proposals and grants, collect and analyze data, publish research findings, disseminate academic insights. PI: Dr. Alison Olechowski, *ReadyLab*

**Visiting Fellow**—Harvard University 2019

- Analyzed data, drafted manuscripts, and disseminated results to their open innovation community. PI: Dr. Karim Lakhani, *Laboratory for Innovation Science at Harvard*

## PUBLICATIONS

### Refereed Journal Articles

**Vrolijk, A.** and Szajnfarber, Z. (2023). “*The Opportunists in Innovation Contests: Understanding Who to Attract and How to Attract Them.*” *Research-Technology Management*, 66(1):30-40. [doi]

- Selected as issue’s open-access article

**Vrolijk, A.**, Roman, M. C., and Szajnfarber, Z. (2022). “*Mapping the Benefits from Innovation Contests.*” *Research-Technology Management*, 65(1):29–38. [doi]

Szajnfarber, Z., Zhang, L., Mukherjee, S., Crusan, J., Hennig, A., and **Vrolijk, A.** (2020). “*Who Is in the Crowd? Characterizing the Capabilities of Prize Competition Competitors.*” *IEEE Transactions on Engineering Management*, p. 1–15. [doi]

Szajnfarber, Z. and **Vrolijk, A.** (2018). “*A Facilitated Expert-Based Approach to Architecting ‘Openable’ Complex Systems.*” *Systems Engineering*, 21, 47–58. [doi]

- Finalist for Best Paper of 2018

**Vrolijk, A.** and Szajnfarber, Z. (2015). “*When Policy Structures Technology: Balancing Upfront Decomposition and In-Process Coordination in Europe’s Decentralized Space Technology Ecosystem.*” *Acta Astronautica*, 106, 33-46. [doi]

- Awarded Best Master’s Research of 2013—Technology, Management and Policy Graduate Consortium

#### Refereed Articles in Conference Proceedings

**Vrolijk, A.**, Deng, Y., and Olechowski, A. (2023). “*Connecting Design Iterations to Performance in Engineering Design*,” ID114, ICED 2023: 24th International Conference on Engineering Design, Bordeaux, France. [doi]

Khanolkar, P. M., **Vrolijk, A.**, and Olechowski, A. (2023). “*A Case Study of the Decision-Making behind the Automation of a Composites-Based Design Process*,” ID415, ICED 2023: 24th International Conference on Engineering Design, Bordeaux, France. [doi]

**Vrolijk, A.** and Szajnfarber, Z. (2020). “*Exploring how Prize Challenges Complement an Organization’s Innovation Efforts*,” MS1031, CESUN 2020: Engineering Systems Symposium, West Lafayette, IN.

**Vrolijk, A.** and Szajnfarber, Z. (2020). “*Leveraging the Household Sector: Local Knowledge, Local Formulation, and Depth of Contribution*,” Paper 21313, Academy of Management Proceedings, Virtual Conference.

Szajnfarber, Z., **Vrolijk, A.**, and Crusan, J. (2014) “*Exploring the Interaction Between Open Innovation Methods and System Complexity*,” CESUN 2014: 4th International Engineering Systems Symposium, Hoboken, NJ.

#### Book Chapters

Roman, M. C., Frangione, C., and **Vrolijk, A.** (2022). “*Leveraging Open Innovation to Incentivize Advances in Additive Construction in Space and on Earth*,” in Hessel, V. et al. (eds) *In-Space Manufacturing and Resources: Earth and Planetary Exploration Applications*. Weinheim, Germany: Wiley-VCH GmbH

#### Research in Progress

**Vrolijk, A.**, Paraviso, E., Crilly, N., and Olechowski, A. “*The Micro-Processes Involved in Searching Complex Design Landscapes: An Exploratory Case Study Using A Bridge-Building Game*.” (Analysis)

**Vrolijk, A.** and Olechowski, A. “*Revealing the Dynamics of Engineering Design: Exploring the Interactions between Artifact, Actors, and Actions through Computer-Aided Design*.” (Manuscript)

Tayyara, O., Flus, M., **Vrolijk, A.**, Amon, C., and Olechowski, A. “*Deep Co-design: A Novel Collaboration Framework for the Electro-thermal Design Process of Power Electronics Systems*.” (Manuscript)

**Vrolijk, A.** and Szajnfarber, Z. “*Requirements, Objectives, Both, or Neither: Formulating Complex Design Problems for Crowdsourcing Under Uncertainty in Knowledge and Capability*.” (Under review at Journal of Mechanical Design)

**Vrolijk, A.** and Szajnfarber, Z. “*Unlocking Useful Input in Crowdsourcing: The Need for Deep Information Exchange when the Crowd (Re)formulates*.” (Under review at Creativity and Innovation Management)

Khanolkar, P. M., **Vrolijk, A.**, and Olechowski, A. “*Mapping AI Tools and Methods to Engineering Design Stages: A Focused Literature Review*.” (Revise and resubmit at Artificial Intelligence for Engineering Design, Analysis, and Manufacturing)

## SELECTED INVITED TALKS

- “*Centering the Human in Engineering Studies*,” Introduction to Mechanical & Industrial Engineering (MIE191), U of T, Canada 2023
- “*What Kind of Solver Should you Attract for your Innovation Contest?*,” Research-Technology Management Journal Lunch & Learn, Virtual session 2023
- “*A Primer on Prize Challenges*,” Canadian Space Agency, Canada 2022
- “*Mapping the Benefits from Innovation Contests*,” Research-Technology Management Journal Lunch & Learn, Virtual session 2022
- “*A Look at Crowdsourcing at NASA Through a Research Lens*,” Principles of Technology Innovation Management (TIMG5001), Carleton University, Canada 2020
- “*Sharing Best Practices from NASA’s Centennial Challenges Program*,” Innovation and Impact Unit, Privy Council Office, Canada 2019
- “*Research Overview of Prize Challenges*,” Natural Resources Canada, Canada 2018
- “*An Open Innovation Primer: Prizes and Challenges*,” Telesat Canada, Canada 2015
- “*Design Structure Matrix Tools Applied to the Asteroid Initiative: Understanding the Role of Open Innovation Methods in the Development of Complex Engineering Systems*,” “Do no harm” Meeting, NASA Asteroid Grand Challenge, Towson, MD. 2014

## TEACHING

- Recurring Guest Lecturer—GWU** 2016-‘22
- “*Research Formulation in Engineering Management and Systems Engineering*” (EMSE 8000, doctoral course)
- Teaching Assistant—GWU** 2017, ‘21
- “*Introduction to Systems Analysis*,” (EMSE 1001, undergraduate core course)
  - “*Research Formulation in Engineering Management and Systems Engineering*” (EMSE 8000, doctoral course)

## MENTORING

- Research Mentor—U of T** 2022-prs.
- Advising Mechanical & Industrial Engineering students under supervision by Dr. A. Olechowski:
- P. M. Khanolkar, Ph.D. Student
  - P. Jian, Ph.D. Student
  - Y. Deng, B.Eng, now on Professional Experience Year internship at PTC Inc.
  - A. Lyakishev, Undergraduate Student
- Research Mentor—GWU** 2019
- Advised Systems Engineering students under supervision by Dr. Z. Szajnfarber:
- J. Groover, B.S., now an Analyst at CYLITIX

## SERVICE

Organization

- Competition Rules and Judging Lead**, Launch Canada, Canada 2022
- Workshop co-organizer**, “*Space House Challenge Design and Execution Workshop.*” NASA Centennial Challenges, Huntsville, AL. 2018
- Workshop co-organizer**, “*Picking the PARTS of the problem where non-experts can meaningfully contribute.*” First International Workshop on Potentially Hazardous Asteroids Characterization, Atmospheric Entry and Risk Assessment, Mountain View, CA. 2015

Peer Reviewing

- Journals:** Research-Technology Management, Space Policy, Systems Engineering
- Conferences:** Canadian Design Workshop (CDW), International Conference on Engineering Design (ICED)

Outreach

- Working Group Member** for CDW’s Design Competitions as a Design Research Setting 2022
- Graduate Student Ambassador** for GWU’s School of Engineering and Applied Sciences (SEAS) 2020-‘21
- Search Committee Member** for Dean of GWU’s SEAS 2019

PROFESSIONAL EXPERIENCE

- Research Assistant**—European Space Agency (ESA) 2012
  - Performed a case study on the development of an astrophysics instrument within the European space science context. Interviewed subject matter experts and program managers at the Netherlands Institute for Space Research, partner institutions, and ESA. PI: Dr. Leopold Summerer, *Advanced Concepts Team*
- Project Coordinator**—International Space University (ISU) 2011
  - Coordinated a joint initiative between ISU and the United Nations (UN) to create a Guidebook on Small Satellites, familiarizing the reader with international small satellite programs. Presented at the 49th Session of the Scientific and Technical Subcommittee of the UN Committee on Peaceful Uses of Outer Space.
- Project Manager**—Heliocentric Technologies Inc. 2010-‘11
  - Performed business development work for a technology start-up researching safer, non-invasive, and cost-effective medical imaging techniques
- Project Assistant**—Defence Construction Canada 2008-‘11
  - Provided project management support to Department of National Defence project managers on capital infrastructure projects. Clearance level: Secret.

ADDENDUM

Nationalities: Canadian and Dutch  
 Languages: English, Papiamento, Dutch (fluent), Spanish (intermediate), French (beginner)