Venkat Akhil Ankem

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SUMMARY

Ph.D. student in Industrial Engineering at Polytechnique Montréal (GERAD), with a research focus on mathematical optimization and mine scheduling. Skilled in developing and analyzing large-scale MIP models using Gurobi, C++, and Python. Actively engaged in the GERAD community as a student representative and DEI committee member, committed to advancing sustainable, inclusive, and data-driven decision-support systems in complex industrial environments.

POSITIONS

GERAD – Montréal, Canada (Aug. 2021 – Present)
Research Assistant (Ph.D. Research)

Rio Tinto – Montréal, Canada (Jul. 2022 – Present)
Graduate – Operations Research (MITACS-supported industrial collaboration)

École Nationale de l'Aviation Civile (ENAC) – Toulouse, France (Jun. 2020 – Jan. 2021)
Research Intern

École Nationale de l'Aviation Civile (ENAC) – Toulouse, France (Jul. 2019 – Sep. 2019)
Summer Research Intern

Korea Advanced Institute of Science and Technology (KAIST) – Daejeon, South Korea (Sep. 2016 – Jul. 2018)
Graduate Research Assistant

MuSigma Inc. – Bengaluru, India (Sep. 2015 – Jul. 2016)
Trainee Decision Scientist

EDUCATION

Polytechnique Montréal – Montréal, Canada (Aug. 2021 – Present)
Ph.D. in Industrial Engineering

- *Supervisors*: Prof. Guy Desaulniers, Prof. Michel Gamache
- *Research focus*: Cutting planes, heuristics, and acceleration strategies for mine scheduling (large-scale MILP/MIP).

École Nationale de l'Aviation Civile (ENAC) – Toulouse, France (Aug. 2018 – Aug. 2021)
M.Sc. in International Air Transport Operations Management

- Foundations of Operations Research with emphasis on aviation systems.
- OR applications: crew scheduling, aircraft route assignment, and maintenance scheduling.

KAIST – Daejeon, South Korea (Sep. 2016 – Jul. 2018)
M.Sc. in Aerospace Engineering

- Aerospace materials and structures; experimental testing and modeling.
- Research outcome: developed a polymer structure with potential for flexible-wing applications.

Amrita Vishwa Vidyapeetham – Coimbatore, India (Sep. 2011 – Jun. 2015)

B.Tech. in Aerospace Engineering

– Research outcome: novel solvent bonding technique for space-application materials.

RESEARCH

Research Interests:

Methodologies: Mathematical Optimization, Mixed-Integer Linear Programming (MILP/MIP), Cutting Planes, Heuristics (Rolling-Horizon / Sliding Window), Constraint Relaxation, Large-Scale Optimization.

Application Areas: Open-pit mine production scheduling, decision-support systems, transportation/aviation operations, industrial analytics.

Journal Papers / Manuscripts:

[1] **Ankem, V. A.**, Desaulniers, G., Gamache, M., Raymond, V. *New cutting planes for open-pit mine scheduling with multi-period block extraction. Computers & Operations Research*, **doi.org/10.1016/j.cor.2026.107408**.

[2] Kim, Y., Park, Y., Cha, J., **Ankem, V. A.**, Kim, C.-G. (2018). *Behavior of Shear Thickening Fluid (STF) impregnated fabric composite rear wall under hypervelocity impact. Composites Structures.*

[3] Sathish Kumar, S. K., **Ankem, V. A.**, Kim, Y., Choi, C., Kim, C.-G. (2018). *Polybenzimidazole (PBI) coated CFRP composite as a front bumper shield for hypervelocity impact resistance in Low Earth Orbit (LEO) environment. Composites Research*, Vol. 31.

[4] Nam, Y.-W., Sathish Kumar, S. K., **Ankem, V. A.**, Kim, C.-G. (2018). *Multi-functional aramid/epoxy composite for stealth space shielding system. Composites Structures.*

[5] **Ankem, V. A.**, Raj, D.D.D., Raj, M.K., Bhat, S.R., Akshay, V., Bhowmik, S. (2015). *Vaporized solvent bonding of poly-methyl methacrylate. Journal of Adhesion Science and Technology.*

PROFESSIONAL EXPERIENCE

Rio Tinto – Montréal, Canada (Jul. 2022 – Present)

Graduate – Operations Research

– MITACS-supported industrial collaboration aligned with Ph.D. research.

– Improved computation time of a mine scheduling model by **90%** using cutting planes and rolling-horizon heuristics.

– Implemented constraint relaxation to accelerate initial feasible solutions, improving computation time by **80%**.

GERAD – Montréal, Canada (Aug. 2021 – Present)

Research Assistant

– Research on mine scheduling using OR techniques under supervision of Prof. Guy Desaulniers and Prof. Michel Gamache.

- Project 1: integrating cutting planes with MIP (article under review).
- Project 2: acceleration strategies to retrieve initial solutions efficiently.
- Presented research at IISE, ISMP, and JOPT.

ENAC – Toulouse, France (Jun. 2020 – Jan. 2021)

Research Intern

- Designed and implemented a Python tool for flight safety.
- Performed flight data analysis and developed interactive visualizations.
- Determined conditions associated with unsafe or abnormal operational situations.
- Analyzed datasets from Be58 and TB20 aircraft types.

ENAC – Toulouse, France (Jul. 2019 – Sep. 2019)

Summer Research Intern

- Analyzed statistical performance metrics across A340-300 flight plans.
- Extracted and cleaned raw data with Python for downstream analysis.
- Used regression and outlier detection in R to ensure model validity.
- Applied machine learning (including Random Forest) for multivariable analysis.

KAIST – Daejeon, South Korea (Sep. 2016 – Jul. 2018)

Graduate Research Assistant

- Experimental and simulation-based research on aerospace materials and composites.
- Fabrication, testing, and modeling; ensured consistency between experimental and simulated results.
- Co-authored two journal publications; presented at international and national conferences.

MuSigma Inc. – Bengaluru, India (Sep. 2015 – Jul. 2016)

Trainee Decision Scientist

- Data analyst for U.S.-based pharmaceutical and retail clients.
- Experience in analytics pipelines, platform development, and database management.
- Tools: SAS, SQL, R, Tableau; worked in an Agile environment with ad-hoc requests.

ACADEMIC CONFERENCES

[1] **Ankem, V. A.**, Desaulniers, G., Gamache, M., Raymond, V. (May 2025). *Improving the performance of production scheduling for open pit mines using cutting planes with additional variables. Journées de l'Optimisation 2025*, Montréal, Canada.

[2] **Ankem, V. A.**, Desaulniers, G., Gamache, M., Raymond, V. (Jul. 2024). *Production scheduling of open pit mines using new cutting planes. International Symposium on Mathematical Programming (ISMP) 2024*, Montréal, Canada.

[3] **Ankem, V. A.**, Desaulniers, G., Gamache, M., Raymond, V. (May 2024). *Production scheduling of open pit mines using new cutting planes. IISE Annual Conference and Expo 2024.*

[4] Choi, C., Kim, Y., Sathish Kumar, S. K., **Ankem, V. A.**, Kim, C.-G. (Jul. 2018). *Enhanced Atomic Oxygen Resistance of CFRP Using POSS/Epoxy Nanocomposites. 11th Asian-Australasian Conference on Composite Materials.*

[5] **Ankem, V. A.**, Sathish Kumar, S. K., Kim, C.-G. (Apr. 2018). *Flexible Skin for in-plane shear morphing in Aerospace structures. Korean Society for Composite Materials (KSCM) 2018.*

[6] Sathish Kumar, S. K., **Ankem, V. A.**, Kim, Y., Kim, C.-G. (Nov. 2017). *Polybenzimidazole (PBI) Film Coated CFRP Composite as a front bumper shield for hypervelocity impact resistance in LEO environment. KSCM 2017.*

[7] Nam, Y.-W., Sathish Kumar, S. K., **Ankem, V. A.**, Kim, C.-G. (Oct. 2017). *Multi-functional aramid/epoxy composite considering stealth space shielding system. 2nd International Conference on Advances in Mechanics of Composite Materials and Structures.*

[8] **Ankem, V. A.**, Badabagni, T., Vaitla, L. (Dec. 2014). *Analysis of delamination propagation of Stringer Reinforced composite panel using Virtual Crack Closure Technique. International Conference on Theoretical, Applied, Computational and Experimental Mechanics.*

AWARDS & HONORS

- **GIFAS Scholarship** (Sep. 2018)
  Received GIFAS (Groupement des industries françaises aéronautiques et spatiales) scholarship, partially funding tuition at ENAC.
- **KAIST Full-Time Scholarship** (Sep. 2016)
  Merit-based full scholarship during graduate education at KAIST.
- **Top 3 in Aerospace Engineering Department** (Mar. 2016)
  Secured 3rd position in departmental ranking based on cumulative academic performance in B.Tech Aerospace Engineering.

GRANTS & FELLOWSHIPS

- **MITACS Fellowship** (Sep. 2022)
  Ph.D. funding jointly supported by Polytechnique Montréal and Rio Tinto.

LEADERSHIP & EXTRACURRICULAR

Student Committee – GERAD (Sep. 2024 – Present)

- Liaison between student members and GERAD management; conveyed concerns and suggestions.
- Collected feedback and promoted student engagement in the research community.
- Organized events supporting networking, collaboration, and professional development.

DEI Committee – GERAD (Sep. 2024 – Present)

- Proposed and implemented initiatives to promote an inclusive research culture.

ENAC Debate Club (Oct. 2018 – Jan. 2021)

- Active member; represented ENAC at Model United Nations (Lyon).

Director – Multimedia, KAIST International Students Association (KISA) (Sep. 2016 – Feb. 2018)

– Led visual design, photography, and website updates for student association activities.

Graduate Student Coordinator – ISSAC (KAIST) (Jan. 2017 – Jan. 2018)

– Coordinated academic events including seminars, workshops, and industry visits.

TECHNICAL SKILLS

Programming: C++, C, Python, SQL, SAS, R

Optimization Solvers: Gurobi, Xpress

Tools/Platforms: LaTeX, GitHub

Interests: Operations Research, data analysis, heuristics, mathematical modeling

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LANGUAGES

English: Full Professional

French: Intermediate

Telugu: Native

Hindi: Full Professional

Tamil: Elementary

Korean: Elementary

REFERENCES

Prof. Guy Desaulniers
Department of Mathematics and Industrial Engineering, Polytechnique Montréal
E-mail: guy.desaulniers@polymtl.ca; guy.desaulniers@gerad.ca

Prof. Michel Gamache
Department of Mathematics and Industrial Engineering, Polytechnique Montréal
E-mail: michel.gamache@polymtl.ca