Curriculum Vitae

Alexey Bochkarev

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Personal info:
Born *(when)* in *(where)*
(*more details*)
(Nationality)
(*Marital status, kids*).

Education

PhD in Industrial Engineering 2018–2021
Clemson University, SC, USA
Operations Research track

Dissertation: "Selected Topics in Network Optimization: Aligning Binary Decision Diagrams for a Facility Location Problem and a Search Method for Dynamic Shortest Path Interdiction." (https://tigerprints.clemson.edu/all_dissertations/2915)
Supervisor: Dr. J. Cole Smith.

MA in Economics 2008–2010
New Economic School, Russia

MSc and BSc in Applied Mathematics and Physics 2004–2010
Moscow Institute of Physics and Technology, Russia

Work experience

Clemson University 2018–2021
Research and teaching. Clemson, SC, USA

Roles: Graduate Assistant.
Focus: Research in Mathematical Optimization. Teaching assistantship in Probability Theory.

Electric energy / The Federal Grid (FGC UES) 2013–2017
Electricity transmission. Moscow, Russia

Roles: Team deputy head → Team head. Modeling and analytics
Focus: Performance benchmarking (branches), operational efficiency improvement.
Internal and external regulations / KPI, strategy, analytics / modeling, and presentations.

Roland Berger Strategy Consultants GmbH 2010–2013
Strategic consulting. Moscow, Russia

Roles: Intern → Junior Consultant → Consultant.
Focus: Infrastructure and construction. Strategy and performance: market entry, supply/demand modeling, growth strategy, efficiency improvement. Internal knowledge sharing, modeling, presentations.

Research experience and outputs

(more)

Current research focus: combinatorial optimization, network optimization and interdiction, decision diagrams and dynamic programming, applications of reinforcement learning techniques. Current projects involve design and implementation of an algorithm and the related computational experiments.

- **Align-BDD:** seeking to obtain computational benefits and sensitivity information by representing a combinatorial problem as a collection of Binary Decision Diagrams (BDDs). The project involves creating a heuristic to enforce a certain structural property for a pair of BDDs and building a related computational pipeline for a specific, hard optimization problem: a variant of the facility location.

- **DSPI:** applying game-playing and reinforcement learning techniques to the Dynamic Shortest-path Interdiction problem, in a framework of a Monte-Carlo Search Tree based algorithm.

Working papers

- A. A. Bochkarev, J.C. Smith, On Aligning Non-Order-Associated Binary Decision Diagrams, under review in *INFORMS Journal on Computing*. Preprint: https://optimization-online.org/2022/08/on-aligning-non-order-associated-binary-decision-diagrams/
- A. A. Bochkarev, J.C. Smith, A Monte Carlo Tree Search for Dynamic Shortest-Path Interdiction, under review in *Networks*.

Talks

- A Monte Carlo Tree Search for Dynamic Shortest-Path Interdiction,
  International Network Optimization Conference, 2022, Aachen, Germany (INOC-2022). 2022
- On Aligning Non-Order-Associated Binary Decision Diagrams,
  INFORMS Annual Meeting, 2020 (virtual), BDD section. 2020

Grants and fellowships

- Clemson University Doctoral Disseration Completion grant 2021
- The Seth Bonder Foundation grant (for INFORMS Annual Meeting) 2021
- International Teaching Fellowship from Clemson University 2020, 2021

Service and volunteering. (more)

- Design and delivery of single lectures and mini-courses for gifted high-school students/undergraduates, for Puschino Winter School (ZPSh) and School for Molecular and Theoretical Biology (SMTB):
  - "Practical Introduction to Probability Theory" 2021
  - "A Glimpse into Algorithms" 2020, 2021, 2022
  - "How to teach machines: simple examples on ML" 2022
- Clemson University INFORMS Student Chapter (Secretary, President) 2020, 2021
- "Journal club on Network optimization and interdiction" (organization) 2021
- "OR Tech Seminar" – a series of four workshops on research toolbox (design and delivery) 2021

Other skills. (more)

- Main programming stack:
  - Python (gurobi, CBC, numpy/pandas, etc.)
  - R (ggplot, dplyr, tidyverse),
  - Julia (JuMP/gurobi, LightGraphs),
  - C++ (gurobi, armadillo/BLAS, boost),
  - basic PyTorch, Java, Matlab/Octave.
- Other tools: PBS (comp cluster), GNU/Linux, bash; make, git, LaTeX, Emacs, basic GIS (QGIS), Inkscape, beamer / PowerPoint / reveal.js, Jupyter.
- (Human) languages: English (fluent), Russian (native), German (∼ A1).