# Dr. Dmitry Kopitkov

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**Education:**

2017-2021 *Technion, Israel Institute of Technology*
Doctor of Philosophy (**Ph.D.**) at Technion Autonomous Systems Program (TASP)

2014-2017 *Technion, Israel Institute of Technology*
Master of Science (**M.Sc.**) at Technion Autonomous Systems Program (TASP)
- Summa Cum Laude: Finished as **outstanding student** with 98 average score

2006-2012 *Tel Aviv-Jaffa College*
Bachelor of Science (**B.Sc.**) in Bio-informatics
- Magna Cum Laude: Finished as **outstanding student** with 91 average score

**Research Experience:**

2017-2021 *Deep probabilistic inference and information recovery*
- Focus of my Ph.D. thesis
- Supervised by Pr. Vadim Indelman, ANPL Lab
- Technologies: Python (+ its many scientific packages), Matlab, TensorFlow
- Neural network optimization study, involved training over 10000 deep models

2014-2017 *Planning in conservative belief space*
- Focus of my M.Sc. thesis
- Supervised by Pr. Vadim Indelman, ANPL Lab
- Technologies: Matlab, C++

2014-2016 *SLAM estimation with Light Bundle Adjustment and Gaussian Processes*
- Responsible for entire research project
- Supervised by Pr. Vadim Indelman, ANPL Lab

2011-2012 *Big human genes*
- Main author of final Bachelor's bioinformatical project

2002-2014 *Variety of research topics during career in hi-tech R&D*

**Publications:**

2020 ***D. Kopitkov***, *V. Indelman, "General Probabilistic Surface Optimization and Log Density Estimation", <arXiv>*

2020 ***D. Kopitkov***, *V. Indelman, "Neural Spectrum Alignment: Empirical Study", International Conference on Artificial Neural Networks (ICANN) 2020, <arXiv>*

2019 ***D. Kopitkov***, *V. Indelman, "Neural Spectrum and Gradient Similarity", Conference on the Mathematical Theory of Deep Neural Networks (DeepMath) 2019, <poster>*

2019 ***D. Kopitkov***, *V. Indelman, "General Purpose Incremental Covariance Update and Efficient Belief Space Planning via Factor-Graph Propagation Action Tree", International Journal of Robotics Research (IJRR), <pdf>*

2018 ***D. Kopitkov***, *V. Indelman, "Robot Localization through Information Recovered From CNN Classificators", International Conference on Intelligent Robots and Systems (IROS) 2018, <pdf>*

2017 ***D. Kopitkov***, *V. Indelman, "No Belief Propagation Required: Belief Space Planning in High-Dimensional State Spaces via Factor Graphs, Matrix Determinant Lemma and Re-use of Calculation", International Journal of Robotics Research (IJRR), <pdf>*

2017 ***D. Kopitkov**, V. Indelman, "Computationally Efficient Belief Space Planning via Augmented Matrix Determinant Lemma and Re-Use of Calculations", International Conference on Robotics and Automation (ICRA) 2017 and IEEE Robotics, <pdf>*

2017 ***D. Kopitkov**, V. Indelman, "Computationally Efficient Belief Space Planning via Augmented Matrix Determinant Lemma and Re-Use of Calculations", IEEE Robotics and Automation Letters (RA-L), <pdf>*

2016 ***D. Kopitkov**, V. Indelman, "Computationally Efficient Decision Making Under Uncertainty in High-Dimensional State Spaces", International Conference on Intelligent Robots and Systems (IROS) 2016, <pdf>*

2016 ***D. Kopitkov**, V. Indelman, "Computationally Efficient Active Inference in High-Dimensional State Spaces", AI for Long-Term Autonomy (AI-LTA) workshop, International Conference on Robotics and Automation (ICRA) 2016 and IEEE Robotics, <pdf, poster, presentation>*

2015 ***D. Kopitkov**, X. Yan, J. Dong, B. Boots, V. Indelman, "Fast continuous incremental SLAM through Light Bundle Adjustment and Gaussian Process", Israeli Conference on Robotics 2016 (Abstract-level), <abstract, presentation>*

2015 ***D. Kopitkov**, V. Indelman, "Computationally Efficient Decision Making and Belief Space Planning in High-Dimensional State Spaces", Israeli Conference on Robotics 2016 (Abstract-level), <abstract, presentation>*

**Graduate courses:**

- Introduction to Machine Learning, grade 96.
- Foundations and Applications of Artificial Intelligence, grade 100.
- Artificial Intelligence and Autonomous Systems, grade 100.
- Introduction to Robotics, grade 98.
- Vision-Aided Navigation, grade 99.
- Process Optimization, grade 100
- Random Processes in Aerospace Systems, grade 100
- Fundamentals in Estimation Theory, grade 100
- Sparse and Redundant Representations and their Applications in Signal and Image Processing, grade 97

**Scholarships awarded, prizes and honors received:**

- 2017 - Completion of Master's degree with Honors: Summa Cum Laude. 98 average score out of 100.
- 2016 - Irwin and Joan Jacobs Fellowship for excellence in graduate studies and research.
- 2015 - Irwin and Joan Jacobs Fellowship for excellence in graduate studies and research.
- 2012 - Completion of Bachelor's degree with Honors: Magna Cum Laude. 91 average score out of 100. Ranked 12 out of 211.
- 2006 - College scholarship for students with high entrance scores, pecuniary amount equal to the cost of the full first college year.
- 2002 - Award for outstanding performance during service, from the military department of operational computer systems, Mamdas.
- 2001 - Award of outstanding completion of high school.

**Research Interests:**

Machine Learning, Deep Learning, Kernel Machines, Probabilistic Inference, Artificial Intelligence, Reasoning, Planning, SLAM, General Artificial Intelligence, Robotics

**Work Experience:**

2013 – 2014 *Interacting Technology (startup company develops social network platform)*

**Team Leader**

- Led an R&D team that builds mobile fundamentals for innovative social network website
- Responsible for product's architecture design and technological solutions
- Supervised the design and implementation of mobile application which is main part of social network

solution
- Work environments: Windows, Microsoft Visual Studio, Flash Builder, TortoiseSVN, TortoiseGit, Scrum
- Technologies: LINQ, ASP .NET, SQL Server, Couchbase, Memcached, Adobe Flash Media Center, Adobe AIR, AJAX, Android
- Programming languages: .NET, ActionScript 3.0, JavaScript, HTML

2011 – 2012 *Intellinx (company develops tools and solutions in the area of internal fraud)*

**Software Developer**

- Served as developer in an R&D team that manufactures infrastructural products for expanding management and test running of rules in the area of internal fraud
- Participated in the design and implementation of new projects, including supervising several of them
- Work environments: Windows, Eclipse, TortoiseSVN, Scrum, Agile
- Technologies: JPA, Hibernate, Spring, Spring Batch, Spring Integration, Eclipse Plugin Development, JBoss Drools, JDBC, MySql, Hsqldb, WebServices, Apache Tomcat, Apache Trinidad, SQL, Ant, Log4j, JUnit
- Programming languages: Java SE, J2EE

2009 – 2011 *Aluna (an SOA consulting company)*

**Software Developer**

- Head developer in a client-server project based on web services technology:
    - Supported the project from beginning to final stages
    - Worked both independently and as part of a team
    - Conducted extensive research activities
- Developer in an integration team that uses Oracle's OSB language – responsible for the design, implementation, and installation of the interfaces into the organization's ERP systems
- Work environments: Windows, Eclipse, Subversion, TortoiseSVN
- Technologies: XML, WebServices, WSDL, Apache Tomcat, Axis2, WebLogic, OSB, Derby, SQL, JMS, Ant, Log4j, JUnit, Apache open source libraries
- Programming languages: Java SE, J2EE

2006 – 2009 *Tadiran Telecom (company develops VOIP telephony switchboards)*

**Software Developer**

- Member of a team the developed framework for a VOIP telephone switchboard:
    - Responsible for all technological aspects of the infrastructure team
    - Led the development of the main part of the system that performs logic within the system
    - Developed, designed, and implemented complex modules within the system
- Member of a team that developed applications for improving the capabilities of the VOIP switchboard:
    - Developed a script-based development infrastructure for the switchboard
    - Designed and implemented various applications for the switchboard
    - Performed expansion-encoding and deciphering of Audio Codecs, such as G729
- Work environments: Eclipse, Visual Studio, Serena Dimensions, Unix, Windows
  Technologies: VOIP, Codecs – G711 G729, protocols – SIP MGCP, GigaSpaces, XML, Java Reflections
- Programming languages: Java SE, J2EE, C, UML, VBScript

**Military Service:**

2001 – 2006 *Israeli Defense Forces (IDF)*

**Software Developer at Mamdas unit – Air Force**

- Successfully completed a programming course at **Mamram with 92 average score**.
- Member of an infrastructure development team for Rich-Client Enterprise Applications:
    - Led the design and implementation of a generic queries infrastructure
    - Extensively used and expanded UI components and low-level mechanisms in Windows
- Member of a team that developed infrastructures and tools for accelerating and improving development processes:
    - Involved in designing and implementing various technological solutions for improving the development process of a central project within the unit
- Received **award for outstanding performance** during service
- Work environments: Delphi Enterprise, WebSphere, ClearCase, ClearQuest, RationalRose, AQTime Profiler, Sleuth Profiler, Visual Studio, JBuilder
- Technologies: COM, MS Office Extension, XML & XSLT, Windows scripting, UI Component Development, Enterprise Java Beans, JNI
- Programming languages: Java SE, J2EE, Delphi, UML, VBScript, Matlab, C++

- Honorable discharge with the rank of First Sergeant

**Professional Courses:**

- Design Patterns
- Advanced Java
- Enterprise JavaBeans

**Other Skills:**

- Fluent in English, Hebrew, and Russian. Some Spanish
- High work ethic, Proven abilities to lead development and design, Deep and quick understanding of a variety of technical problems, Ability to work independently, Strong learning and researching abilities