Nedialko Krouchev

Montreal (Quebec)
(438) 333-5242

Applied Engineer-at-heart Expertise You Can Trust

Work Experience

 Plusgrade Inc., Montreal (Quebec)

Software Engineer, August 2022 – August 2025
● Designed and implemented back-end software for data-logic analysis and performance-related data persistence using advanced, object-oriented Java and the Spring Boot framework.
● Developed and deployed service code for inventory management and third-party payment providers, utilizing Docker and various scripting languages.
● Served as a Subject Matter Expert (SME) in international airline passenger duties, taxes, and fees, applying this domain knowledge to enhance product compliance.

 ORS / Comet Inc., Montreal (Quebec)

Software Developer / Data Scientist, December 2021 – July 2022 (Contract)
● Contract - with main objective to develop a framework for real-time control of a plasma generator
● Developed advanced, object-oriented algorithmic code in Python and C++ to support the company's data science and visualization platforms.
● Applied data science methodologies using libraries like pandas and scikit-learn to process and visualize data.
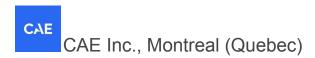
 Zetane Systems Inc., Montreal (Quebec)

ML/AI Engineer, September 2020 – November 2021 (Contract)
● Contributed to the development of cutting-edge real-time visualization tools for deep neural network tensors.

● Collaborated with advanced teams at IBM and Microsoft to provide efficient and seamless access to core visualization tools.

CAE Inc., Montreal (Quebec)

Controls Systems and QA Engineer, July 2018 – September 2020 (Contract)
● Automated real-time testing and certification of closed-loop, Software-in-the-Loop (SIL) systems for the Airbus A3xx vehicle simulation.
● Mastered tools for real-time aircraft identification data acquisition and matching, directly contributing to the rigorous testing and certification process of flight simulators.

Adacel Inc. - Aviation and Aerospace Component Manufacturing

Software Engineer, January 2018 – July 2018 (Contract)

● Designed and implemented software enhancements for real-time system-test automation, supporting Air Traffic Management (ATM) and Air-Tower Control (ATC) product lines.
● Developed advanced, original Object-Oriented (OO) code in C/C++ to create QA automation tools.

Montreal Neurological Institute & Hospital, McGill University

Postdoctoral Fellow, January 2014 – December 2017

● Experience with image processing: Used and refined biomedical imaging algorithms for the registration of MRI image stacks, ensuring precise alignment for analysis.
● Experience with advanced modeling and algorithms, leveraging tools such as TensorFlow and Keras, model conversions and optimization tools
● Experience porting code between languages and from research level code in Matlab or Python to real-time and highly-parallel and high-performance (aka super-computing) C/C++ code
● Familiarity with commonly used libraries: e.g. OpenCV, scipy, numpy.

Polytechnique Montréal - Dept. Biomedical Engineering

Ph.D. Biomedical Engineering and Computational Neuroscience, May 2009 - Jan 2015

● Conducted multi-scale computational modeling from the microscopic to the mesoscopic level, demonstrating expertise in analyzing complex systems.

UNIVERSITÉ de MONTRÉAL

Research Associate (Member SGPPUM), October 1999 – April 2009

● Authored or co-authored 15+ original publications in high-impact, peer-reviewed journals.
● Contributed key scientific findings that advanced the understanding of motor neurophysiology and the brain's synergistic control of movement.

CAE Inc., Montreal (Quebec)

Energy Control Systems - Controls and OR Engineer, August 1996 – December 1999

● Implemented turn-key Energy Management Systems with smart SCADA-based real-time energy-distribution control.
● The system optimizer utilized large-scale MIP formulations and the CPLEX library, ensuring grid stability and preventing costly power outages.

IBM Bulgaria, Sofia (Bulgaria) - IBM Services

Project Manager, December 1992 – August 1996

● Project manager for midrange systems - AS-OS/400, RS-AIX/6000
● National Language support and standards; Technical writing and mentoring
● Pioneered the IBM BG National Education Center from the ground up, reconciling the high-cost training model with a fledgling post-totalitarian market.
● Transformed the center from a one-person operation into a robust enterprise by recruiting and directing a team of technical instructors.

Education

Coursera
Business-Analysis-Oriented Optimization and Operations Research, 2024 - 2025

Polytechnique MONTRÉAL
PhD, Biomedical Engineering and Computational Neuroscience, 2009 - 2015
(R&D focus)
- Graduate Degree in Biomedical Engineering

TU Sofia - Faculty of Automation
M.Sc. in Electrical Engineering (Automation/Control System Engineering), 1989 - 1992
- Graduate Degree in Electrical Engineering

Selected Publications

- **From Squid to Mammals with the HH Model through the Na_v Channels' Half-Activation-Voltage Parameter**
  - *Nedialko I. Krouchev, F. Rattay, M. Sawan, A. Vinet. PLoS ONE 10(12), 2015.*
  - *This research demonstrates the application of **non-linear dynamics theory** to understand and model **complex biological systems.**

- **Energy-Optimal Electrical-Stimulation Pulses Shaped by the Least-Action Principle**
  - *Nedialko I. Krouchev, S. M. Danner, A. Vinet, F. Rattay, M. Sawan. PLoS ONE 9(3), 2014.*
  - *This paper uses **optimization** and physical principles to analyze and **improve complex bio-systems.**

- **Motor cortical regulation of sparse synergies during precision walking**
  - *Nedialko Krouchev, Trevor Drew. Frontiers in computational neuroscience 7, 2013.*
  - *This paper explores **motor control and coordination in complex biological systems.**

- **Motor control in a meta-network with attractor dynamics**
  - *N. I. Krouchev, J. F. Kalaska. Progress in Brain Research 165, 2007.*
  - *This research demonstrates the application of **non-linear dynamics theory** to understand and model **complex neural networks.**

- **Sequential activation of muscle synergies during locomotion in the intact cat as revealed by cluster analysis and direct decomposition**
  - *N. Krouchev, J. F. Kalaska, T. Drew. Journal of neurophysiology 96 (4), 2006.*
  - *This work contributed key scientific findings about the **brain's synergistic control of movement** in complex biological systems.

- **Context-dependent anticipation of different task dynamics: rapid recall of appropriate motor skills using visual cues**
  - *N. I. Krouchev, J. F. Kalaska. Journal of Neurophysiology 89(2), 2003.*
  - *This research provided insights into the **encoding of motor skills** and the brain's ability to adapt to new tasks, a key area of **motor neurophysiology.**