



MICHAŁ BATSCH

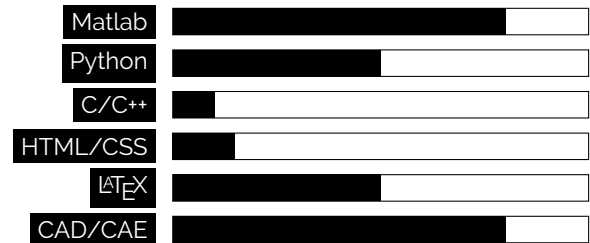
BEng, MSc, PhD

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ABOUT ME

I have over ten years of experience in scientific programming and computations including image and signal processing. Recently my scientific interests expanded to machine learning and neural networks. As a problem-solving-oriented person with the ability to understand complicated mathematical models and a strong mechanical engineering background, I am ready to dive into a data-driven world as a data scientist/ML engineer.



TOOLS

- NumPy
- Pandas
- Matplotlib
- OpenCV
- Scipy
- Scikit-learn
- Tensorflow
- Keras
- Inventor, KissSoft, KiMOS

SKILLS

- scientific computations
- signal and image processing
- machine learning
- neural networks
- research planning and carrying
- interdisciplinary team leading
- mechanical engineering
- mathematical modelling
- differential geometry

PROFESSIONAL EXPERIENCE

- 2013 – now **Assistant Professor** **Rzeszow University of Technology**
Scientific computations and programming, signal and image processing, machine learning, research in mechanical engineering, teaching machine design, geometry, kinematics, and computer-aided design.
- 2015 – 2020 **Lead design engineer** **EL-Automatyka**
part time
Design for production automation, 3D CAD modelling, developing the constructional solutions, drafting.

SELECTED R&D PROJECTS

- 2022–2023 **Mechatronics engineer** **FortiFruits**
Project no. POPW.01.01.02-18-0116/21 entitled *Introduction of product innovation to the market - soft fruit extracts with increased antioxidant content for the production of dietary supplements, food, and pharmaceutical industries*
- 2022 **Image processing specialist** **University of Rzeszów**
Grant no. N3_063, PCI-1GRA.5133.40.2021.ADZ entitled *Development of an innovative method for examining the visual field and mobility of the cervical spine, using virtual reality technology*
- 2022 **Scientific internship** **SZEL-TECH**
Project no. RPPK.01.02.00-18-0002/20 entitled *Development and implementation of technology for producing aircraft assemblies with an integral thin-walled structure*
- 2020 – 2022 **R&D team leader – Mechatronics engineer** **LIMET**
Project no. POIR.01.01.01-00-0630/19 entitled *Research on the development of a predictive system for diagnostics and processing of seals in brake, fuel, and gas installations*
- 2020–2021 **Project manager** **Rzeszow University of Technology**
Project no. POIR.02.03.02-18-0114/19 entitled *Development of an optimal technical and functional design of an innovative type of mobile elevating work platform for modernization and construction of bridge structures as a result of research and development work*
- 2016 – 2017 **Gear analysis expert** **Inżynieria Rzeszów**
Project no. POIR.01.01.01-00-0286/15-00 entitled *Designing an innovative type of a scraper with an integrated planetary drive for new or modernized sedimentation tanks*

2014 – 2015	Researcher Project no. POIG.01.01.02-00-015/08-00 entitled <i>Modern Material Technologies in Aerospace Industry</i>	Rzeszow University of Technology
2013	Design engineer Project no. INNOTECH-K2/IN2/39/182334/NCBR/13 entitled <i>Development and implementation of plastic forming technology with resistance heating of aircraft engine components made of difficult-to-deform nickel-iron superalloys</i>	Rzeszow University of Technology
2010 – 2012	Design engineer Project no. OR00011611 entitled <i>UAV for terrain surveillance</i>	Rzeszow University of Technology

EDUCATION

2015	Doctor of Engineering Construction and Exploitation of Machines	Rzeszow University of Technology
2013	Master of Science Mechanics and Machine Building (specialty: mechanical drives)	Rzeszow University of Technology
2012	Bachelor of Engineering Automation and Robotics (specialty: computer science in robotics)	Rzeszow University of Technology

SELECTED PROJECTS

Gear fault detection by unsupervised deep learning of autoencoder

</> Python, TensorFlow, Scikit-learn, NumPy, Scipy, Pandas [🔗 Read more](#)

Vibration excitation in gearboxes due to surface deviations

</> Python, NumPy, Scipy, Matlab, Differential geometry, Optimization Toolbox [🔗 Read more](#)

The method of prediction of tooth profile deviations in gear honing

</> Matlab, Differential geometry, Optimization Toolbox [🔗 Read more](#)

Vision-based control of small educational double SCARA robot

</> Python, OpenCV, TensorFlow, Scikit-learn, NumPy, Scipy, C, RaspberryPI, Matlab, Automatic code gen. [🔗 Read more](#)

Image processing algorithm for evaluation of the roundness of small objects

</> Matlab, Image processing toolbox, Optimization Toolbox [🔗 Read more](#)

What is the optimal shape of sofa?

</> Matlab, Differential geometry, Optimization Toolbox [🔗 Read more](#)

SELECTED SCIENTIFIC PUBLICATIONS

Helical Bevel Novikov Gears

👤 Michał Batsch 📅 2022 📖 Novikov/Conformal Gearing ed. by S.P. Radzevich, Springer [doi 10.1007/978-3-031-10019-2](#)

A Numerical Approach for Analysing the Moving Sofa Problem

👤 Michał Batsch 📅 2022 📖 Symmetry, 14(7) [doi 10.3390/sym14071409](#)

Image processing algorithm to assess the roundness of blanks for the production of copper seals for brake, fuel and gas installations

👤 Michał Batsch, Waldemar Witkowski, Dawid Wydrzyński 📅 2021 📖 Mechanik, 7 [doi 10.17814/mechanik.2021.7.10](#)

Mathematical model and tooth contact analysis of convexo-concave helical bevel Novikov gear mesh

👤 Michał Batsch 📅 2020 📖 Mechanism and Machine Theory, 149 [doi 10.1016/j.mechmachtheory.2020.103842](#)

A novel method of obtaining honing tool profile for machining gears with profile modifications

👤 Michał Batsch 📅 2020 📖 ASME Journal of Manufacturing Science and Engineering, 142(9) [doi 10.1115/1.4047351](#)

Measurement and mathematical model of convexo-concave Novikov gear mesh

👤 Michał Batsch, Tadeusz Markowski, Stanisław Legutko, Grzegorz Królczyk 📅 2018 📖 Measurement, 125 [doi 10.1016/j.measurement.2018.04.095](#)

LANGUAGES

- Polish - native
- English - C1 level

AWARDS

- third degree award of the Committee on Mechanics of the Polish Academy of Sciences
- six awards from the Head of the RUT

INTERESTS

- motorcycles
- music
- skiing
- microcontrollers