



Poland, Rzeszów

+48 604 547 260

michal.batsch@gmail.com

michal-batsch

mbatsch

 R^{G}

Michal-Batsch

Portfolio

B-8363-2017

ABOUT ME

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



TOOLS

- NumPy
- Pandas
- Matplotlib

- OpenCV
- Scipy
- Scikit-learn

- Tensorflow
- Keras
- Google Cloud (ongoing course)

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 **R&D Assistant Professor**

Rzeszow University of Technology

Scientific computations and programming, signal and image processing, machine learning, discrete and differential geometry, research in mechanical engineering, teaching machine design, geometry, kinematics, and computer-aided design (Inventor/AutoCAD).

2015 - 2020 part time

Lead design engineer

EL-Automatyka

Design for production automation, 3D CAD modelling, developing the constructional solutions, drafting.

SELECTED R&D PROJECTS

2022-2023 Mechatronic 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

R&D team leader - Mechatronic engineer 2020 - 2022

LIMET

Project no. POIR.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

l agree to the processing of personal data provided in this document for realising the recruitment process pursuant to the Personal Data Protection Act of 10 May 2018 (Journal of Laws 2018, item 1000) and in ement with Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free move of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

1/2

2014 - 2015 Researcher Rzeszow University of Technology

Project no. POIG.01.01.02-00-015/08-00 entitled Modern Material Technologies in Aerospace Industry

2013 Design engineer Rzeszow University of Technology

Project no. INNOTECH-K2/IN2/39/182334/NCBR/13 entitled Development and implementation of plastic forming technology with resistance heating of aircraft engine components made of difficult-to-

deform nickel-iron superalloys

2010 – 2012 **Design engineer** Rzeszow University of Technology

Project no. ORO0011611 entitled UAV for terrain surveillance

EDUCATION

2015 **Doctor of Engineering** Rzeszow University of Technology

Construction and Exploitation of Machines

2013 Master of Science Rzeszow University of Technology

Mechanics and Machine Building (specialty: mechanical drives)

2012 Bachelor of Engineering Rzeszow University of Technology

Automation and Robotics (specialty: computer science in robotics)

SELECTED PROJECTS

Gear fault detection by unsupervised deep learning of autoencoder

Y> Python, TensorFlow, Scikit-learn, NumPy, Scipy, Pandas Read more

Vibration excitation in gearboxes due to surface deviations

Yython, NumPy, Scipy, Matlab, Differential geometry, Optimization Toolbox % Read more

The method of prediction of tooth profile deviations in gear honing

Vision-based control of small educational double SCARA robot

Python, OpenCV, TensorFlow, Scikit-learn, NumPy, Scipy, C, RaspberryPl, Matlab, Automatic code gen. Sead 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 🚭 10.1007/978-3-031-10019-2

A Numerical Approach for Analysing the Moving Sofa Problem

▲ Michał Batsch ## 2022 ## Symmetry, 14(7) ## 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 🚳 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 🚭 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) (10.1115/1.4047351

Measurement and mathematical model of convexo-concave Novikov gear mesh

L Michał Batsch, Tadeusz Markowski, Stanisław Legutko, Grzegorz Królczyk 🛗 2018 🗐 Measurement, 125

6 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

l agree to the processing of personal data provided in this document for realising the recruitment process pursuant to the Personal Data Protection Act of 10 May 2018 (Journal of Laws 2018, item 1000) and in agreement with Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).