Lukasz Rauch
ResearcherID G-4899-2013
Scopus Author ID 22036526500
Scopus Author ID 55387245500
ORCID: http://orcid.org/0000-0001-5366-743X
T: (+48) 12 617 38 75, F: (+48) 12 617 28 89
M: (+48) 600 490 331, lrauch@agh.edu.pl
WWW: http://home.agh.edu.pl/lrauch/

Kraków, 05.07.2024

# CURRICULUM VITAE

## Education

09.2016: D.Sc. in Computer Science at the Institute of Fundamental Technological Research Polish Academy of Sciences; „Methodology of multiscale modelling with application of heterogeneous hardware architectures"

03.2007: Ph.D. in Computer Science at the AGH University of Science and Technology in Kraków; Ph.D. thesis: „Design of new algorithms, based on the particles dynamics, dedicated to images and multidimensional data processing",

06.2003.: M.Sc. of Business Administration at the AGH University of Science and Technology. Master thesis: "The Design of Customer Relationship Management Systems based on the e-technology",

05.2002: M.Sc. of Computer Science at the AGH University of Science and Technology. Master thesis: "Speech Recognition by using Fractal Transformation for English and Polish Vowels",

1993-1997: Secondary School in Wadowice, Poland,

## Work experience

03.2019 – now: professor at AGH University of Science and Technology, responsible for:

- *Organization*:
  - Deputy Dean for Reasearch and Cooperation from 09.2020,
  - Head of Department of Applied Computer Science and Modelling 11.2016-10.2020,
- *Research* – multiscale modelling on heterogeneous hardware architectures, improvement of computational efficiency of numerical simulations, grid and cloud computing, industrial applications of hybrid computer system, expert systems,
- *Teaching* – Java Programming, Advanced Internet Technologies, Internet Engineering, Operational Systems, Programming Basics, Object-Oriented Programming, Graph Theory, Pattern Recognition.

10.2003 – 02.2019: assistant professor at AGH University of Science and Technology, responsible for research & education.

03.2013 – 10.2016: senior researcher at Academic Computer Centre Cyfronet AGH, responsible for leading research tasks in the following project PlGrid Plus, PlGrid NG and VirtRoll (Virtual Rolling Mill).

12.2003 – 02.2013: DUO, privately held company, range of services: computer science – design and implementation of Internet applications especially *Content Management Systems*, 35 Internet web applications completed, including 12 advanced management systems,

02.2004 – 02.2011: assistant at Private Higher School of Management and Banking in Kraków, responsible for teaching of Programming languages and techniques (C++, Java),

05.2002 – 06.2003: project leader in bci-konsulting – Kraków, responsible for business analysis, requirement specification, system's design, implementation in practice and training, CRM software development, organization of conferences and workshops on "Computer aided sales".

05.2001 - 04.2002 r.: software architect at Bankowe Centrum Informatyki – Kraków, responsible .

## The most important recent publications with Impact Factor

1. Kuziak R., Zalecki W., Radwański K., Piwowarczyk M., Wolańska N., **Rauch L.**, Maciej Pietrzyk, Application of the phase transformation model for the design of the cooling conditions in Stelmor process to obtain a favorable multiphase microstructure of wire rod for cold heading applications, Steel Research International, 94(7), pp. 1-12, 2023.
2. Sztangret L., Regulski K., Pernach M., **Rauch L.**, Prediction of temperature of liquid steel in ladle using machine learning techniques, Coatings, 13(9), pp. 1-18, 2023.

3. Czyżewska N., Kusiak J., Morkisz P., Oprocha P., Pietrzyk M., Przybyłowicz P., **Rauch L.**, Szeliga D., On mathematical aspects of evolution of dislocation density in metallic materials, IEEE Access, electronic edition, 2022.
4. Piwowarczyk M., Wolańska N., Pietrzyk M., **Rauch L.**, Kuziak R., Zalecki W., Phase transformation model for adjusting the cooling conditions in Stelmor process to obtain the targeted structure of thermomechanically rolled wire rod used for fastener production, Metallurgical Research & Technology, 119(5), pp. 1-12, 2022.
5. Hajder P., **Rauch L.**, Moving multiscale modelling to the edge: benchmarking and load optimization for cellular automata on low power microcomputers, Processes, 9(12), pp. 1-20, 2021.
6. Milenin A., Zalecki W., Pernach M., Rauch L., Kuziak R., Zygmunt T., Pietrzyk M., Numerical simulation of manufacturing process chain for pearlitic and bainitic steel rails, Archives of Civil and Mechanical Engineering, 20(4), pp.1-18, 2020.
7. **Rauch L.**, methodology for efficient performance of multiscale modeling methods in heterogeneous hardware infrastructures, International Journal for Multiscale Computational Engineering, 17(3), 281–299, 2019.
8. Bachniak Daniel, **Rauch Łukasz**, Pietrzyk Maciej, Kusiak Jan, Selection of the optimization method for identification of phase transformation models for steels, Materials and Manufacturing Processes, 32(11), 1248-1259, 2017.
9. Pernach Monika, Bzowski Krzysztof, **Rauch Łukasz**, Pietrzyk Maciej, Analysis of predictive capabilities of multiscale phase transformation models based on the numerical solution of heat transfer and diffusion equations, International Journal for Multiscale Computational Engineering, 15(5), 413-430, 2017.
10. **Rauch Łukasz**, Chmura Adrian, Gronostajski Zbigniew, Polak Slawomir, Pietrzyk Maciej, Cellular automata model for prediction of crack initiation and propagation in hot forging tools, Archives of Civil and Mechanical Engineering, 16(3), 437-447, 2016.

## The most important grants in recent years

**As a leading investigator:**

1. POIR.01.01.01-00-0996/19, Opracowanie innowacyjnego hybrydowego systemu cyber-fizycznego, umożliwiającego zintegrowane zarządzanie technologią stalowniczą wraz z transportem ciekłego metalu w stalowni ŁPE–PK–COS dla sekwencyjnego układu wytopów, w aspektach optymalizacji temperatury ciekłej stali w kadzi pośredniej COS, celem poprawy jakości wlewków ciągłych, 2020-2023.
2. POIR.01.02.00-00-0091/19, Opracowanie systemu badań nieniszczących realizowanych w sposób ciągły wraz z opracowaniem oprogramowania sterującego pracą zgrzewarki liniowej w oparciu o analizę parametrów mechanicznych zgrzewu liniowego, 2020-2022.
3. Techmatstrateg_II/406725/1/NCBR/2020, Opracowanie technologii wysokociśnieniowego hartowania gazowego satelitarnych kół zębatych epicyklicznej przekładni lotniczej silnika FDGS, wykonanych ze stali Pyrowear 53 i pracujących w warunkach długotrwałych i cyklicznie zmiennych obciążeń eksploatacyjnych, 2020-2023.
4. Techmatstrateg_1/348491/10/NCBR/2017, Energooszczędna technologia obróbki cieplno-plastycznej z wykorzystaniem ciepła kucia, 2017-2020.
5. 2014/15/B/ST8/00187, Application of knowledge based systems for control of uncertainty in optimization of metal forming processes, financed by National Science Centre, 2015-2018.
6. POIR.01.02.00-00-0211/17-00, INNOSTAL II, Developing and implementing an optimal logistics model and cooling model at the coil stockyard before pickling line in ArcelorMittal Poland S.A., 2018-2021, leader
7. POIR.01.02.00-00-0212/17-00, INNOSTAL II, Development of innovative solutions in scope of automation of wagon loading and coke testing with application of advanced data bases and IT systems, 2018-2021, leader
8. Techmatstrateg1/348491/10/NCBR/2017, Energy-saving thermo-mechanical treatment of forging with the use of the forging heat, 2017-2020

**As an investigator:**

1. PBS3/B5/39/2015, Development of hybrid production technology of rails characterized by increased durability in the service conditions involving innovative trends in railway transport, 2015-2018.
2. 2016/23/G/ST5/04059, Program Beethoven, Distribution functions for the description of heterogeneous metallic microstructures, 2016-2019.
3. 2015/19/B/ST8/01064, Syntactic, multiscale computational models of high-performance for materials with limited ductility, 2016-2019
4. 2014/13/B/ST8/03812, Multi-scale modelling of materials on modern computer architectures, based on virtual representations, 2014-2017.
5. RFCS VirtRoll, Virtual rolling mill, financed by Research Funds for Coal and Steel, with ArcelorMittal Poland, 2012-2016.
6. INNOLOT/I/10/NCBR/2014, Advanced techniques of manufacturing of aircraft transmission, with Pratt&Whitney, 2014-2016.

7. INNOLOT/I/7/NCBR/2013, Turbine for Turboshaft Engine Demonstrator, with Pratt&Whitney, 2013-2016.

## Prizes

1. 2023, Third grade individual award for scientific achievements granted by the Rector of AGH University of Science and Technology, Krakow.
2. 2022, Third grade individual award for scientific achievements granted by the Rector of AGH University of Science and Technology, Krakow.
3. 2022, Second grade team award for achievements in didactics granted by the Rector of AGH University of Science and Technology, Krakow.
4. 2021, Third grade individual award for scientific achievements granted by the Rector of AGH University of Science and Technology, Krakow.
5. 2020, First grade team award for achievements in didactics granted by the Rector of AGH University of Science and Technology, Krakow.
6. 2016 Award for a publication of book: Pietrzyk M., Madej L., Rauch L., Szeliga D., Computational Materials Engineering, Achieving High Accuracy and Efficiency in Metals Processing Simulations, Elsevier, Inc., ISBN: 978-0-12-416707-0, 2015.
7. 2012 Award for supervising of the work awarded in „Diamonds of AGH" competition entitled: Optimization of microstructure properties by using genetic algorithms and digital material representation, granted by the Rector of AGH University of Science and Technology, Krakow
8. 2011 Award for exceptional involvement and efforts for development of students scientific association, granted by the Rector of AGH University of Science and Technology, Krakow
9. 2010 Third grade individual award for scientific achievements granted by the Rector of AGH University of Science and Technology, Krakow.
10. 2009 Award for supervising of the work entitled „Programming techniques of Internet applications in practice" granted by the Rector of AGH University of Science and Technology, Krakow
11. 2008 First grade team award for scientific achievements granted by the Rector of AGH University of Science and Technology, Krakow.
12. 2007 Best Paper Award – International Society for Productivity Enhancement (www.ispe-org.net) for the paper "Complex Modelling Platform based on Digital Material Representation"