

## Marta Karas

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### CONTACT INFORMATION

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USA

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### EDUCATION

**Johns Hopkins Bloomberg School of Public Health**, Baltimore, MD, USA

*Ph.D., Biostatistics*, Aug 2017–present

- Academic Advisors: Ciprian Craniceanu, Jacek K. Urbanek

**Wroclaw University of Science and Technology**, Wroclaw, Poland

*M.S., Mathematics* (Mathematical Statistics), Jul 2015

- Dissertation: “Theoretical and practical issues in change point detection.”
- Academic Advisor: Malgorzata Bogdan
- Final grade: 5.5 (Excellent). Graduation with Academic Distinction

**Wroclaw University of Science and Technology**, Wroclaw, Poland

*B.S., Mathematics*, Jun 2013

- Final grade: 5.0 (Very good)

### ACADEMIC EXPERIENCE

**Johns Hopkins University**, Department of Biostatistics, Bloomberg School of Public Health, Baltimore, MD, USA

*Research Assistant*

**Jan 2018 - present**

- Developed and published open-source method for pattern segmentation from high-frequency accelerometry data.
- Designed and conducted small studies (1-3 participants, 1-4 sensors, 1h-a few days) to collect high-frequency accelerometry data in free-living/with semi-supervised exercise bouts. Made some of collected data open-source.
- Work in progress: developing functional registration framework for estimation of gait asymmetry from high-frequency accelerometry data in stroke survivor population.
- Work in progress: developing method for high-specificity identification of walking from wrist-worn accelerometry data collected in free-living.

**Indiana University Bloomington**, Department of Epidemiology and Biostatistics, School of Public Health, Bloomington, IN, USA

*Research Assistant*

**Jan 2017 - Jul 2017**

- Applied graph-constrained regularization methods to determine what brain structural imaging markers are associated with HIV+/HIV– status.

**Indiana University – Purdue University Indianapolis**, Department of Biostatistics, Richard M. Fairbanks School of Public Health, Indianapolis, IN, USA

*Research Assistant*

**Jan 2016 - Jul 2016**

- Developed extension of existing graph-constrained regularization methods for linear regression. Investigated what brain structural imaging markers are associated with alcohol abuse.

TEACHING  
EXPERIENCE

**Johns Hopkins University**, Department of Biostatistics, Bloomberg School of Public Health, Baltimore, MD, USA

*Teaching assistant*

- 2019-20 Term 2 - 140.652 Methods in Biostatistics II. *Lead TA (lab, office hours)*
- 2019-20 Term 1 - 140.651 Methods in Biostatistics I. *Lead TA (lab, office hours)*
- 2018-19 Term 4 - 140.624 Statistical Methods in Public Health IV. *TA*
- 2018-19 Term 3 - 140.623 Statistical Methods in Public Health III. *TA*
- 2018-19 Term 2 - 140.652 Methods in Biostatistics II. *Lab TA*
- 2018-19 Term 1 - 140.651 Methods in Biostatistics I. *Lab TA*

*Instructor*

- 2019-20 Term 1 - 140.850 - Special topics course: Biostatistical Methods for Wearable Computing. *Co-instructor*

HONORS AND  
AWARDS

1. Leadership, Empowerment and Learning Culture Award. Novartis US Analytics Conference. 2019
2. ENAR Poster Award. ENAR. 2017

PUBLICATIONS

1. **Karas, M.**, Straczekiewicz, M., Fadel, W., Harezlak, J., Crainiceanu, C., Urbanek, J.K. *Adaptive empirical pattern transformation (ADEPT) with application to walking stride segmentation, Biostatistics*, 2018.
2. **Karas, M.**, Bai, J., Straczekiewicz, M., Harezlak, J., Glynn, N W., Harris, T., Zipunnikov, V., Crainiceanu, C., Urbanek, J.K. *Accelerometry data in health research: challenges and opportunities. Review and examples, Statistics in Biosciences*, 2018. ([Article link](#))
3. Brzyski, D., **Karas, M.**, Ances, B., Dziedzic, M., Goni, J., Randolph, T.W., Harezlak, J. *Connectivity-Informed Adaptive Regularization for Generalized Outcomes*, 2017. ([Preprint link](#))
4. **Karas, M.**, Brzyski, D., Dziedzic, M., Goni, J., Kareken, D.A., Randolph, T., Harezlak, J. *Brain connectivity-informed regularization methods for regression*, Statistics in Biosciences, 2017. ([Article link](#))

CONFERENCE  
POSTERS

1. **Karas, M.**, Brzyski, D., Ances, B., Goni, J., Randolph, T.W., Harezlak, J. *Association of Structural Brain Imaging Measures with HIV Markers Incorporating Structural Connectivity Information: a Regularized Statistical Approach*. ENAR, Washington DC, USA, Mar 2017. (Received [ENAR Poster Award](#)).
2. **Karas, M.** *Penalized regression inference regarding variable selection in high dimensions: presentation of selected methods implemented in R*. European R Users Conference, Poznan, Poland, Oct 2016.

CONFERENCE/INVITED  
TALKS

1. **Karas, M.**, Roemmich, R., Bastian, A., Urbanek, J.K. Urbanek, Crainiceanu, C. *Functional registration of walking strides in high-density accelerometry data for estimation of gait asymmetry*. CFE-CMStatistics 2019 conference, London, UK, Dec 2019.
2. **Karas, M.**, Dorn, J. *Walking measurements derived from free-living wrist-worn sensor as novel digital endpoints*. Novartis 2019 US Analytics Conference, East Hanover, NJ, USA, Oct 2019.
3. **Karas, M.**, Roemmich, R., Crainiceanu, C., Bastian, A., Urbanek, J.K. *Automatic estimation of step asymmetry from accelerometry data*. ICAMPAM 2019, Maastricht, The Netherlands, Jul 2019.

4. **Karas, M.**, Harezlak, J., Strackiewicz, M., Fadel, W., Crainiceanu, C., Urbanek, J.K. *ADaptive Empirical Pattern Transformation (ADEPT) with application to walking stride segmentation*. JSM 2018, Vancouver, Canada, Aug 2018.
5. **Karas, M.**. *Wearable accelerometers, accelerometry data and automatic steps segmentation in R: strideter and convo R packages*. Why R? 2018 Conference, Wroclaw, Poland, Jul 2018.

## SOFTWARE

1. **adept** R package: Adaptive Empirical Pattern Transformation. (*CRAN*, *GitHub*, *website*). (Selected in Top 40 new CRAN packages in May 2019; *list link*)
2. **adeptdata** R package: Accelerometry Data Sets. (*CRAN*, *GitHub*)
3. **runstats** R package: Fast Computation of Running Statistics for Time Series. (*CRAN*, *GitHub*, *website*)
4. **mdpeer** R package: Graph-Constrained Regression with Enhanced Regularization Parameters Selection. (*CRAN*)

## INDUSTRY EXPERIENCE

**Novartis** (Pharmaceutical), Basel, Switzerland

*Sensor Data Analytic Intern*

**Jun 2019 - Aug 2019**

- Proposed and implemented method for free-living walking segmentation from wrist-worn accelerometry sensor.
- Identified associations derived between walking features and PROs in diseased population.

**Opera Software** (Software), Wroclaw, Poland

*Analyst*

**Aug 2016 - Dec 2016**

- Developed time-series forecasting models for Opera browser's core metrics.
- Performed Bayesian analysis to describe and infer about browser's users performance.

**Opera Software** (Software), Wroclaw, Poland

*Analyst*

**Jul 2015 - Dec 2015**

- Established methodology for A/B-test results analysis, including selection of statistical methods and implementation of a complete tool in R.
- Performed user base analysis for software product improvements.

**Datarino** (Big Data Services & Data Management Solutions), Wroclaw, Poland

*Data Scientist*

**Jul 2014 - Mar 2015**

- Analyzed user activity and monetization KPIs of a Polish social networking service.
- Retrieved knowledge from business partners' big-data size data sets.

**KRUK S.A.** (Debt collection), Wroclaw, Poland

*Intern*

**Jun 2014**

- Compared feature selection methods addressing serious correlation problem.
- Implemented and applied a text mining tool for utilizing unstructured text data in R.

**QuantUp** (Data analysis, modeling and training), Wroclaw, Poland

*Intern*

**Jul 2013 - Apr 2014**

- Performed research and case-study analysis of building and validating scoring models.
- Wrote articles about reproducible research tools and large-size data analysis tools in R.

## COMPUTER SKILLS

- Experienced: R, Python.

COMPETITIONS AND  
HACKATONS

1. 2nd place in Data Analysis Marathon: "Determining tabloidization index". Krakow, Poland, Nov 2015.
2. Participation in "HackZurich // The biggest European hackathon". Zurich, Switzerland, Oct 2015.
3. The Winner of the Schneider Electric Business Analyst Competition 2015. Wroclaw, Poland, Jun 2015.
4. 2nd place in the Independent National Data Analysis Competition "NOMAD" V edition 2015. Wroclaw, Poland, Jun 2015.
5. 2nd place in the Independent National Data Analysis Competition "NOMAD" IV edition 2014. Wroclaw, Poland, Jun 2014.
6. The Winner of the KRUK Analytics Challenge 2014. Wroclaw, Poland, May 2014.