

CURRICULUM VITAE

Prof. RNDr. Karel Hron, Ph.D.



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Description of academic career and positions

2007-2013 **Assistant Professor**
Department of Mathematical Analysis and Applications of Mathematics,
Faculty of Science, Palacký University in Olomouc

2013-2021 **Associate Professor**
Department of Mathematical Analysis and Applications of Mathematics,
Faculty of Science, Palacký University in Olomouc

2021-to present **Professor**
Department of Mathematical Analysis and Applications of Mathematics,
Faculty of Science, Palacký University in Olomouc

2018-2022 **Vice-Dean for External Relations**

2018-to present **Vice-Head of Department**

Education and training

2020 Professorship (prof., equivalent to Professor) in Applied Mathematics
Faculty of Science, University of Ostrava, Ostrava, Czech Republic

2013 Habilitation (doc., equivalent to Associate Professor) in Mathematics – Applied
Mathematics
Faculty of Science, Masaryk University, Brno, Czech Republic

2008 RNDr. (University Doctor of Natural Sciences) in Applications of Mathematics in
Economy
Faculty of Science, Palacký University, Olomouc, Czech Republic

2005 – 2007 Ph.D. study in Applied Mathematics
Faculty of Science, Palacký University, Olomouc, Czech Republic
principal subjects: mathematical statistics, multivariate statistics
thesis: *Twoepoch linear models with nuisance parameters*
(supervisor: Prof. Dr. Lubomír Kubáček)

2006 – 2007	Research stay & training in Applied Statistics Dept. of Statistics and Probability Theory, Vienna University of Technology, Austria principal subjects: multivariate data statistics, R software for statistical computing
2000 – 2005	Master degree (Mgr., equivalent to MSc.) in Applications of Mathematics in Economy Faculty of Science, Palacký University, Olomouc, Czech Republic

Main area of research

Statistical analysis of compositional data

Compositional data are multivariate observations carrying relative information, popularly expressed in percentages, proportions, ppm, mg/kg, etc. Their statistical analysis reflects the specific nature of compositional data by considering log-ratios of the components rather than the original values and forming new easy-to-handle coordinates, where the standard statistical methods can be applied and properly interpreted. The concept of compositional data can be generalized also to probability density functions, which share the scale invariance property, under the Bayes spaces methodology.

Highest academic prizes/recognition received

5 most important academic prizes/awards received

1. 1st prize in national part of Competition in Student Research Activities (section Probability Theory, Statistics, Econometrics and Financial Mathematics (2004)
2. Palacký University Rector Price for the best student thesis in mathematics (2004, 2005)
3. TIES (The International Environmetrics Society) Best Student Presentation Award (2007)
4. Editor's Best Reviewer Award, Mathematical Geosciences (2017)
5. Simon's CRM Professor, McGill University, Montreal (2020, two months) – postponed to 2022/23 due to COVID-19 pandemic

Most important activities and memberships in academic/scientific organizations

1. Member of Board of Directors, International Association for Statistical Computing - European Regional Section (2012-2016, 2020-2024)
2. Executive Committee Member (Publication Officer), International Association for Statistical Computing (2021-2023)
3. Council Member, International Association for Mathematical Geosciences (2020-2024)
4. Secretary General, Association for Compositional Data (2017-2019)
5. Member of Scientific Board of Faculty of Science, Palacký University, Olomouc, Czech Republic (2014-)
6. Reviewer – peer reviews for international statistical and geological journals, cca 90 reviews in the last 5 years

Publication activity

1 book: Filzmoser, P., Hron, K., Temp, M. *Applied Compositional Data Analysis*, Springer Series in Statistics. Springer, Cham, 2018

1 edited book: Filzmoser, P., Hron, K., Martín-Fernández, J.A., Palarea-Albaladejo, J. (eds.) *Advances in Compositional Data Analysis*. Springer, Cham, 2021.

8 chapters in books, cca 100 papers in peer-reviewed journals

120 items in Web of Science, 2986 cites (without self-citations), Hirsch index 27 (October 2022), actually ca. 700 cites per year.

Publication activity is focused on development of the logratio methodology for compositional data analysis with a wide range of applications covering geochemistry, chemometrics and time-use epidemiology.

Most important research projects funded in last five years

1. **Generation and Transfer of Compositional Data Analysis Knowledge (CODA-GENERA).** (PID2021-123833OB-I00) – 2022-2025, member of the research team
Fund Provider: Spanish Ministry of Science and Innovation and by ERDF A way of making Europe
2. **Generalized relative data and robustness in Bayes spaces.** (22-15684L) – 2022-2024, co-principal investigator (together with Peter Filzmoser, TU Wien)
Fund provider: The Czech Science Foundation
3. **Optimizing the 24-h movement behaviors for obesity prevention in the post-pandemic era.** (22-02392S) – 2022-2024, member of the research team
Fund provider: The Czech Science Foundation
4. **Separation of Geochemical Signals in Sediments: Application of Advanced Statistical Methods on Large Geochemical Datasets.** (19-01768S) – 2019-2021, principal investigator
Fund provider: The Czech Science Foundation
5. **Identification of Regulatory Networks Controlling Pea Seed Coat Development Using Combination of RNA Sequencing, Protein and Metabolites Analysis.** (19-07155S) – 2019-2021, member of the research team
Fund provider: The Czech Science Foundation
6. **Application of a Novel Compositional Data Analysis Approach for the Evaluation of Combined Effects of 24-hour Lifestyle Behaviors on Childhood Obesity.** (18-09188S) – 2018-2020, member of the research team
Fund provider: The Czech Science Foundation
7. **Statistics in Metabolomics for Biomarker Research in Medicine.** (15-34613L) – 2015-2017, member of the research team
Fund provider: The Czech Science Foundation, jointly with Austrian Science Fund FWF
8. **Functional Data Analysis and Related Topics.** (15-06991S) – 2015-2017, member of the research team
Fund provider: The Czech Science Foundation
9. **Text, functional and other high-dimensional data in econometrics: New models, methods, applications.** (CA21163) – 2022-2025, member of the research team
Fund provider: COST Association
10. **Statistical and Machine Learning Techniques in Human Microbiome Studies.** (CA18131) – 2019-2023, member of the research team
Fund provider: COST Association
11. **Soil Science & Archaeo-Geophysics Alliance.** (CA17131) – 2020-2022, member of the research team
Fund provider: COST Association

12. **Computationally-Intensive Methods for the Robust Analysis of Non-Standard Data.** (IC1408)
– 2015-2019, member of the research team, member of the Management Committee
Fund provider: COST Association

Top 10 publications

- Hron, K., Menafoglio, A., Palarea-Albaladejo, J., Filzmoser, P., Talská, R., Egozcue, J.J. *Weighting of parts in compositional data analysis: Advances and applications*. *Mathematical Geosciences*, 54 (2022), 71-93. DOI: 10.1007/s11004-021-09952-y
- Štefelová, N., Alfons, A., Palarea-Albaladejo, J., Filzmoser, P., Hron, K. *Robust regression with compositional covariates including cellwise outliers*. *Advances in Data Analysis and Classification*, 15 (2021), 869-909. DOI: 10.1007/s11634-021-00436-9
- Talská, R., Hron, K., Matys Grygar, T. *Compositional scalar-on-function regression with application to sediment particle size distributions*. *Mathematical Geosciences*, 53 (2021), 1667-1695. DOI: 10.1007/s11004-021-09941-1
- Hron, K., Engle, M., Filzmoser, P., Fišerová, E. *Weighted symmetric pivot coordinates for compositional data with geochemical applications*. *Mathematical Geosciences*, 53 (2021), 655-674. DOI: 10.1007/s11004-020-09862-5
- Talská, R., Menafoglio, A., Hron, K., Egozcue, J.J., Palarea-Albaladejo, J. *Weighting the domain of probability densities in functional data analysis*. *Stat*, 9 (2020), No. 1, e283 (13 pages). DOI: 10.1002/sta4.283
- Filzmoser, P., Hron, K., Templ, M. *Applied Compositional Data Analysis*, Springer Series in Statistics, Springer, Cham, 2018
- Fačevicová, K., Hron, K., Todorov, V., Templ, M. *General approach to coordinate representation of compositional tables*. *Scandinavian Journal of Statistics*, 45 (2018), No. 4, 879-899. DOI: 10.1111/sjos.12326
- Talská, R., Menafoglio, A., Machalová, J., Hron, K., Fišerová, E. *Compositional regression with functional response*. *Computational Statistics and Data Analysis*, 123 (2018), 66-85. DOI: 10.1016/j.csda.2018.01.018
- Hron, K., Menafoglio, A., Templ, M., Hružová, K., Filzmoser, P. *Simplicial principal component analysis for density functions in Bayes spaces*. *Computational Statistics and Data Analysis*, 94 (2016), 330-350. DOI: 10.1016/j.csda.2015.07.007
- Templ, M., Hron, K., Filzmoser, P., Gardlo, A. *Imputation of rounded zeros for high-dimensional compositional data*. *Chemometrics and Intelligent Laboratory Systems*, 155 (2016), 183-190. DOI: 10.1016/j.chemolab.2016.04.011

List of publications

1a) Books

Filzmoser, P., Hron, K., Templ, M. *Applied Compositional Data Analysis*, Springer Series in Statistics, Springer, Cham, 2018

1b) Books (as editor)

Filzmoser, P., Hron, K., Martín-Fernández, J.A., Palarea-Albaladejo, J. (eds.) *Advances in Compositional Data Analysis*. Springer, Cham, 2021.

2) Peer-reviewed journal articles

- Matys Grygar, T., Elznicová, J., Tůmová, Š., Kylich, T., Skála, J., Hron, K., Álvarez-Vázquez, M.Á. *Moving from geochemical to contamination maps using incomplete chemical information from long-term high-density monitoring of Czech agricultural soils*. *Environmental Earth Sciences*, 82 (2023), 6 (21 pages)
- Bábek, O., Fačevicová, K., Žídek, M., Sedláček, J., Muehlmann, C., Nordhausen, K., Hron, K. *X-ray fluorescence scanning of soft and wet-sediment cores in terrestrial environments; a robust blind source separation approach*. *Journal of Geochemical Exploration*, 243 (2022), 107106 (12 pages).
- Rasmussen, C.L., Holtermann, A., Hron, K., Dumuid, D., Nørregaard Rasmussen, C.D. *The use of time flow analysis to describe changes in physical ergonomic work behaviours following a cluster-randomized controlled participatory ergonomic intervention*. *Annals of Work Exposures and Health*, 66 (2022), No. 9, 1199-1209.
- Hron, K., Menafoglio, A., Palarea-Albaladejo, J., Filzmoser, P., Talská, R., Egozcue, J.J. *Weighting of parts in compositional data analysis: Advances and applications*. *Mathematical Geosciences*, 54 (2022), 71-93.
- Rubín, L., Gába, A., Pelclová, J., Štefelová, N., Jakubec, L., Dygrýn, J., Hron, K. *Changes in sedentary behavior patterns during the transition from childhood to adolescence and their association with adiposity: A prospective study based on compositional data analysis*. *Archives of Public Health*, 80 (2022), 1 (9 pages).
- Rasmussen, C.L., Dumuid, D., Hron, K., Gupta, N., Jorgensen, M.B., Nabe-Nielsen, K., Holtermann, A. *Day-to-day pattern of work and leisure time physical behaviours: are low socioeconomic status adults couch potatoes or work warriors?* *BMC Public Health*, 21 (2021), No. 1, 1342 (13 pages)
- Faměra, M., Matys Grygar, T., Ciszewski, D., Czajka, A., Álvarez-Vázquez, M.Á., Hron, K., Fačevicová, K., Hýlová, V., Tůmová, Š., Světlík, I., Zimová, K., Dvořáková, K., Szypuła, B., Hošek, M., Henych, J. *Anthropogenic records in a fluvial depositional system: the Odra River in the Czech-Polish border area*. *Anthropocene*, 34 (2021), 100286 (11 pages).
- Talská, R., Hron, K., Matys Grygar, T. *Compositional scalar-on-function regression with application to sediment particle size distributions*. *Mathematical Geosciences*, 53 (2021), 1667-1695.
- Pelclová, J., Štefelová, N., Olds, T., Dumuid, D., Hron, K., Chastin, S., Pedišić, Ž. *A study on prospective associations between adiposity and 7-year changes in movement behaviors among older women based on compositional data analysis*. *BMC Geriatrics*, 21 (2021), 203 (11 pages).
- Štefelová, N., Alfons, A., Palarea-Albaladejo, J., Filzmoser, P., Hron, K. *Robust regression with compositional covariates including cellwise outliers*. *Advances in Data Analysis and Classification*, 15 (2021), 869-909.
- Hron, K., Coenders, G., Filzmoser, P., Palarea-Albaladejo, J., Faměra, M., Matys Grygar, T. *Analyzing pairwise logratios revisited*. *Mathematical Geosciences*, 53 (2021), No. 7, 1643-1666.
- Štefelová, N., Palarea-Albaladejo, J., Hron, K. *Weighted pivot coordinates for partial least squares-based marker discovery in high-throughput compositional data*. *Statistical Analysis and Data Mining*, 14 (2021), No. 4, 315-330.
- Moreno-Indias, I., Lahti, L., Nedyalkova, M., Elbere, I., Roshchupkin, G.V., Adilovic, M., Aydemir, O., Bakir-Gungor, B., Carrillo-de Santa Pau, E., D'Elia, D., Desai, M.S., Falquet, L., Gundogdu, A., Hron, K., Klammsteiner, T., Lopes, M.B., Marcos Zambrano, L.J., Marques, C., Mason, M., May, P., Pašić, L., Pio, G., Pongor, S., Promponas, V.J., Przymus, P., Sáez-Rodríguez, J., Sampri, A., Shigdel, R., Stres, B., Suharoschi, R., Truu, J., Tručič, C.-O., Vilne, B., Vlachakis, D.P., Yilmaz, E., Zeller, G., Zomer, A., Gómez-Cabrero, D., Claesson, M. *Statistical and machine learning techniques in human microbiome studies: contemporary challenges and solutions*. *Frontiers in Microbiology*, section Evolutionary and Genomic Microbiology, 12 (2021), 635781 (9 pages).
- Hron, K., Engle, M., Filzmoser, P., Fišerová, E. *Weighted symmetric pivot coordinates for compositional data with geochemical applications*. *Mathematical Geosciences*, 53 (2021), No. 4, 655-674.

- de Sousa, J., Hron, K., Fačevicová, K., Filzmoser, P. *Robust principal component analysis for compositional tables*. *Journal of Applied Statistics*, 48 (2021), No. 2, 214-233.
- Marcos Zambrano, L.J., Karaduzovic-Hadziabdic, K., Loncar-Turukalo, T., Przymus, P., Trajkovic, V., Aasmets, O., Berland, M., Gruca, A., Hasic Telalovic, J., Hron, K., Klammsteiner, T., Kolev, M., Lahti, L., Lopes, M.B., Moreno, V., Naskinova, I., Org, E., Paciência, I., Papoutsoglou, G., Shigdel, R., Stres, B., Vilne, B., Yousef, M., Zdravevski, E., Tsamardinos, I., Carrillo de Santa Pau, E., Claesson, M., Moreno Indias, I., Truu, J. *Applications of machine learning in human microbiome studies: a review on feature selection, biomarker identification, disease prediction and treatment*. *Frontiers in Microbiology*, section Systems Microbiology, 12 (2021), 634511 (25 pages).
- Gába, A., Dygrýn, J., Štefelová, N., Rubín, L., Hron, K., Jakubec, L. *Replacing school and out-of-school sedentary behaviors with physical activity, and its associations with adiposity in children and adolescents: A compositional isotemporal substitution analysis*. *Environmental Health and Preventive Medicine*, 26 (2021), 16 (9 pages).
- Matys Grygar, T., Mach, K., Koubová, M., Martinez, M., Hron, K., Fačevicová, K. *Beginning of the Miocene Climatic Optimum in central Europe in sediment archive of the Most Basin, Czech Republic*. *Bulletin of Geosciences*, 96 (2021), No. 1, 61-81.
- McGregor, D.E., Palarea-Albaladejo, J., Dall, P.M., Hron, K., Chastin S.F.M. *Cox regression survival analysis with compositional covariates: application to modelling mortality risk from 24-hour physical activity patterns*. *Statistical Methods in Medical Research*, 29 (2020), No. 5, 1447-1465.
- Talská, R., Machalová, J., Smýkal, P., Hron, K. *A comparison of seed germination coefficients using functional regression*. *Applications in Plant Sciences*, 8 (2020), No. 8, e11366 (11 pages).
- Matys Grygar, T.M., Mach, K., Hron, K., Fačevicová, K., Martinez, M., Zeeden, C., Schnabl, P. *Lithological correction of chemical weathering proxies based on K, Rb, and Mg contents for isolation of orbital signals in clastic sedimentary archives*. *Sedimentary Geology*, 406 (2020), 105717 (12 pages).
- Talská, R., Menafoglio, A., Hron, K., Egozcue, J.J., Palarea-Albaladejo, J. *Weighting the domain of probability densities in functional data analysis*. *Stat*, 9 (2020), No. 1, e283 (13 pages).
- Álvarez-Vázquez, M.Á., Hošek, M., Elznicová, J., Pacina, J., Hron, K., Fačevicová, K., Talská, R., Bábek, O., Matys Grygar, T. *Separation of geochemical signals in fluvial sediments: new approaches to grain-size control and anthropogenic contamination*. *Applied Geochemistry*, 123 (2020), 104791 (16 pages).
- Gába, A., Dygrýn, J., Štefelová, N., Rubín, L., Hron, K., Jakubec, L., Pedišić, Ž. *How do short sleepers use extra waking hours? A compositional analysis of 24-hour time-use patterns among children and adolescents*. *International Journal of Behavioral Nutrition and Physical Activity*, 17 (2020), No. 1, 104 (11 pages).
- Gába, A., Pedišić, Ž., Štefelová, N., Dygrýn, J., Hron, K., Dumuid, D., Tremblay, M. *Sedentary behavior patterns and adiposity in children: a study based on compositional data analysis*. *BMC Pediatrics*, 20 (2020), No. 1, 147 (11 pages).
- Vencálek, O., Hron, K., Filzmoser, P. *A comparison of generalized linear models and compositional data analysis for parameter estimation in ordered categories models*. *Statistical Modelling*, 20 (2020), No. 3, 249-273.
- Renzi, J.P., Duchoslav, M., Brus, J., Hradilová, I., Pechanec, V., Václavek, T., Machalová, J., Hron, K., Verdier, J., Smýkal, P. *Physical dormancy release in *Medicago truncatula* seeds is related to environmental variations*. *Plants*, 9 (2020), 503 (21 pages).
- Pelclová, J., Štefelová, N., Dumuid, D., Pedisic, Z., Hron, K., Gába, A., Olds, T., Pechová, J., Zajac-Gawlak, I., Tlučáková, L. *Are longitudinal reallocations of time between movement behaviours associated with adiposity among elderly women? A compositional isotemporal substitution analysis*. *International Journal of Obesity*, 44 (2020), 857-864.

- Dumuid, D., Pedišić, Ž., Palarea-Albaladejo, J., Martín-Fernández, J.A., Hron, K., Olds, T. *Compositional data analysis in time-use epidemiology: what, why, how*. International Journal of Environmental Research and Public Health, 17 (2020), 2220 (17 pages).
- de Sousa, J., Vencálek, O., Hron, K., Václavík, J., Friedecký, D., Adam, T. *Bayesian multiple hypotheses testing in compositional analysis of untargeted metabolomic data*. Analytica Chimica Acta, 1097 (2020), 49-61.
- Cuberek, R., Pelclová, J., Gába, A., Pechová, J., Svozilová, Z., Přidalová, M., Štefelová, N., Hron, K. *Adiposity and changes in movement-related behaviors in older adult women in the context of the built environment: a protocol for a prospective cohort study*. BMC Public Health, 19 (2020), 1522 (7 pages).
- Hradilová, I., Duchoslav, M., Brus, J., Pechanec, V., Hýbl, M., Kopecký, P., Smržová, L., Štefelová, N., Václavík, T., Machalová, J., Hron, K., Bariotakis, M., Pirintsos, S., Smýkal, P. *Variation in wild pea (Pisum sativum subsp. elatius) seed dormancy and its relationship to the environment and seed coat traits*. PeerJ, 7 (2019), e6263 (32 pages).
- Filzmoser, P., Hron, K. *Comments on: Compositional data: the sample space and its structure*. TEST, 28 (2019), 639-643.
- Dumuid, D., Pedisic, Z., Stanford, T.E., Martín-Fernández, J.A., Hron, K., Maher, C., Lewis, L.K., Olds, T.S. *The compositional isotemporal substitution model: a method for estimating changes in a health outcome for reallocation of time between sleep, physical activity, and sedentary behaviour*. Statistical Methods in Medical Research, 28 (2019), No. 3, 846-857.
- Štefelová, N., Dygrýn, J., Hron, K., Gába, A., Rubín, L., Palarea-Albaladejo, J. *Robust compositional analysis of physical activity and sedentary behaviour data*. International Journal of Environmental Research and Public Health, 15 (2018), No. 10, 2248 (18 pages).
- Matys Grygar, T., Hošek, M., Pacina, J., Štojdl, J., Bábek, O., Sedláček, J., Hron, K., Talská, R., Kříženecká, S., Tolaszová, J. *Change in geochemistry of fluvial sediments after dam construction (the Chrudimka River, the Czech Republic)*. Applied Geochemistry, 98 (2018), 94-108.
- Majerová, L., Bábek, O., Navrátil, T., Nováková, T., Štojdl, J., Elznicová, J., Hron, K., Matys Grygar, T. *Dam reservoirs as efficient trap for historical pollution: pass of Hg and Pb through Ohře River, Czech Republic*. Environmental Earth Sciences, 77 (2018), 574 (12 pages).
- Fačevicová, K., Hron, K., Todorov, V., Templ, M. *General approach to coordinate representation of compositional tables*. Scandinavian Journal of Statistics, 45 (2018), No. 4, 879-899.
- Talská, R., Menafoglio, A., Machalová, J., Hron, K., Fišerová, E. *Compositional regression with functional response*. Computational Statistics and Data Analysis, 123 (2018), 66-85.
- Chen, J., Zhang, X., Hron, K., Templ, M., Li, S. *Regression imputation with Q-mode clustering for rounded zero replacement in high-dimensional compositional data*. Journal of Applied Statistics, 45 (2018), No. 11, 2067-2080.
- Di Palma, M.A., Filzmoser, P., Gallo, M., Hron, K. *A robust PARAFAC model for compositional data*. Journal of Applied Statistics, 45 (2018), No. 8, 1347-1369.
- Müller, I., Hron, K., Fišerová, E., Šmahaj, J., Cakirpaloglu, P., Vančáková, J. *Interpretation of compositional regression with application to time budget analysis*. Austrian Journal of Statistics, 47 (2018), No. 2, 3-19.
- Walach, J., Filzmoser, P., Hron, K., Walczak, B., Najdekr, L. *Robust biomarker identification in a two-class problem based on pairwise log-ratios*. Chemometrics and Intelligent Laboratory Systems, 171 (2017), 277-285.
- Reimann, C., Filzmoser, P., Hron, K., Kynčlová, P., Garrett, R. *A new method for correlation analysis of compositional (environmental) data – a worked example*. Science of the Total Environment, 607-608 (2017), 965-971.

- Dumuid, D., Stanford, T.E., Olds, T., Lewis, L.K., Martín-Fernández, J.A., Pedisic, Z., Hron, K., Katzmarzyk, P.T., Barreira, T., Broyles, S.T., Chaput, J.P., Fogelholm, M., Hu, G., Lambert, E.V., Maia, J., Sarmiento, O.L., Standage, M., Tremblay, M.S., Tudor-Locke, C., Maher, C. *Compositional data analysis for physical activity, sedentary time and sleep research*. *Statistical Methods in Medical Research*, 27 (2018), No. 12, 3726-3738.
- Weinerová, H., Hron, K., Bábek, O., Šimíček, D., Hladil, J. *Quantitative allochem compositional analysis of Lochkovian-Pragian boundary sections in the Prague Basin (Czech Republic)*. *Sedimentary Geology*, 354 (2017), 43-59.
- Hron, K., Filzmoser, P., Caritat, P. de, Fišerová, E., Gardlo, A. *Weighted pivot coordinates for compositional data and their application to geochemical mapping*. *Mathematical Geosciences*, 49 (2017), No. 6, 797-814.
- Hrůzová, K., Rypka, M., Hron, K. *Compositional analysis of trade flows structure*. *Austrian Journal of Statistics*, 46 (2017), No. 2, 49-63.
- Kynčlová, P., Hron, K., Filzmoser, P. *Correlation between compositional parts based on symmetric balances*. *Mathematical Geosciences*, 49 (2017), No. 6, 777-796.
- Templ, M., Hron, K., Filzmoser, P. *Exploratory tools for outlier detection in compositional data with structural zeros*. *Journal of Applied Statistics*, 44 (2017), No. 4, 734-752
- Templ, M., Hron, K., Filzmoser, P., Gardlo, A. *Imputation of rounded zeros for high-dimensional compositional data*. *Chemometrics and Intelligent Laboratory Systems*, 155 (2016), 183-190.
- Hron, K., Brito, P., Filzmoser, P. *Exploratory data analysis for interval compositional data*. *Advances in Data Analysis and Classification*, 11 (2017), No. 2, 223-241.
- Fišerová, E., Donevska, S., Hron, K., Bábek, O., Vaňkátová, K. *Practical aspects of log-ratio coordinate representations in regression with compositional response*. *Measurement Science Review*, 16 (2016), No. 5, 235-243.
- Fačevicová, K., Bábek, O., Hron, K., Kumpan, T. *Element chemostratigraphy of the Devonian/Carboniferous boundary – a compositional approach*. *Applied Geochemistry*, 75 (2016), 211-221
- Gardlo, A., Smilde, A., Hron, K., Hrdá, M., Karlíková, R., Friedecký, D., Adam, T. *Normalization techniques for PARAFAC modeling of urine metabolomics data*. *Metabolomics*, 12 (2016), No. 7, 1-13.
- Mert, C., Filzmoser, P., Hron, K. *Error propagation in isometric logratio coordinates for compositional data: Theoretical and practical considerations*. *Mathematical Geosciences*, 48 (2016), No. 8, 941-961.
- Hrůzová, K., Todorov, V., Hron, K., Filzmoser, P. *Classical and robust orthogonal regression between parts of compositional data*. *Statistics*, 50 (2016), No. 6, 1261-1275.
- Fačevicová, K., Hron, K., Todorov, V., Templ, M. *Compositional tables analysis in coordinates*. *Scandinavian Journal of Statistics*, 43 (2016), No. 4, 962-977.
- Kynčlová, P., Filzmoser, P., Hron, K. *Compositional biplots including external non-compositional variables*. *Statistics*, 50 (2016), No. 5, 1132-1148.
- McKinley, J.M., Hron, K., Grunsky, E., Reimann, C., de Caritat, P., Filzmoser, P., van den Boogaart, K.G., Tolosana-Delgado, R. *The single component geochemical map: Fact or fiction*. *Journal of Geochemical Exploration*, 162 (2016), 16-28.
- Machalová, J., Hron, K., Monti, G.S. *Preprocessing of centred logratio transformed density functions using smoothing splines*. *Journal of Applied Statistics*, 43 (2016), No. 8, 1419-1435.
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- Hron, K. *Remark on properties of bases for additive logratio transformations of compositional data*. *Acta Univ. Palacki. Olomuc., Fac. rer. nat. Math.*, 47 (2008), 77-82.
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3) Refereed book chapters

- Filzmoser, P., Hron, K., Menafoglio, A. *Logratio approach to distributional modeling*. In: Daouia, A., Ruiz-Gazen, A. (2021) *Advances in contemporary statistics and econometrics*. Festschrift in honor of Christine Thomas-Agnan. Springer, Cham: 451-470.
- Dumuid, D., Pedišić, Ž., Palarea-Albaladejo, J., Martín-Fernández, J.A., Hron, K., Olds, T. *Compositional data analysis in time-use epidemiology*. In: Filzmoser, P., Hron, K., Martín-Fernández, J.A., Palarea-Albaladejo, J. (2021) *Advances in compositional data analysis*. Festschrift in honour of Vera Pawlowsky-Glahn. Springer, Cham: 383-404.
- Filzmoser, P., Hron, K. *Compositional data analysis in chemometrics*. In: Tauler, R., Walczak, B., Brown, S.D. (2020) *Comprehensive chemometrics: Chemical and biochemical data analysis*, 2nd edition. Elsevier, Amsterdam: 641-662.
- Walach, J., Filzmoser, P., Hron, K. *Data normalization and scaling: Consequences for the analysis in omics sciences*. In: Jaumot, J., Bedia, C., Tauler, R. (2018) *Data analysis for omics sciences: Methods and applications*. Elsevier, Amsterdam: 165-196.
- Filzmoser, P., Hron, K. *Robust coordinates for compositional data using weighted balances*. In: Nordhausen, K., Taskinen, S. (2015) *Modern nonparametric, robust and multivariate methods*. Springer, Heidelberg: 167-184.
- Filzmoser, P., Hron, K. *Robustness for compositional data*. In: Becker, C., Fried, R., Kuhnt, S. (2013) *Robustness and complex data structures*. Springer, Heidelberg: 117-131.
- Filzmoser, P., Hron, K. *Robust statistical analysis*. In: Pawlowsky-Glahn, V., Buccianti, A. (2011) *Compositional data analysis: Theory and applications*. Wiley, Chichester: 59-72.
- Templ, M., Hron, K., Filzmoser, P. *robCompositions: An R-package for robust statistical analysis of compositional data*. In: Pawlowsky-Glahn, V., Buccianti, A. (2011) *Compositional data analysis: Theory and applications*. Wiley, Chichester: 341-355.

4) Conference proceedings

- CoDaWork 2015, L'Escala, Spain: Tolosana-Delgado, R., van den Boogaart, K.G., Fišerová, E., Hron, K., Dunkl, I. *Joint compositional calibration: a geochronological example*

MME 2014, Olomouc, CZ: Hrůzová, K., Hron, K., Todorov, V., Filzmoser, P. *Regression among parts of compositional data with an economic application*

MME 2014, Olomouc, CZ: Fačevicová, K., Todorov, V., Hron, K. *Compositional tables analysis with application to manufacturing*

SMPS 2014, Warsaw, Poland: Pavlačka, O., Hron, K. *Interval compositional data: Problems and possibilities*

CoDaWork 2013, Vorau, Austria: van den Boogaart, K.G., Tolosana-Delgado, R., Hron, K., Templ, M., Filzmoser, P.: *Compositional regression with unobserved components or below detection limit values*

CoDaWork 2013, Vorau, Austria: Fačevicová, K., Hron, K.: *Statistical analysis of 2x2 compositional tables*

CoDaWork 2013, Vorau, Austria: Hrůzová, K., Hron, K.: *Compositional data analysis of German national accounts*

CoDaWork 2013, Vorau, Austria: Kalivodová, A., Hron, K., Župková, M., Friedecký, D.: *Partial least squares for compositional data used in metabolomics*

SIS 2013, Brescia, Italy: Hron, K., Filzmoser, P.: *Exploring compositional data with the robust compositional biplot*

IAMG 2013, Madrid, Spain: Hron, K., Filzmoser, P., Templ, M., van den Boogaart, K.G., Tolosana-Delgado, R. *Robust regression with compositional response: Application to geosciences*

SMPS 2012, Konstanz, Germany: Hron, K., Filzmoser, P. *Robust diagnostics of fuzzy clustering results using the compositional approach*

CoDaWork'11, Sant Feliu de Guíxols (Girona), Spain: Filzmoser, P., Hron, K., Templ, M. *Robust compositional data analysis*

CoDaWork'11, Sant Feliu de Guíxols (Girona), Spain: Templ, M., Filzmoser, P., Hron, K. *Analysis of compositional data using robust methods. The R-package robCompositions*

Robust 2010, Králíky, CZ: Hron, K. *Elementy statistické analýzy kompozičních dat*

COMPSTAT 2010, Paris, France: Filzmoser, P., Hron, K. *Robust methods for compositional data*

CDAM 2010, Minsk, Belarus: Hron, K., Templ, M., Filzmoser, P. *Exploratory compositional data analysis using the R-package robCompositions*

CDAM 2010, Minsk, Belarus: Filzmoser, P., Hron, K. *Multivariate outlier detection with compositional data*

SMPS 2010, Oviedo, Spain: Hron, K., Filzmoser, P. *Elements of robust regression for data with absolute and relative information*

NTTS 2009, Brussels, Belgium: Templ, M., Filzmoser, P., Hron, K. *Robust imputation of missing values in compositional data using the R-package robCompositions*

UNECE 2009, Neuchatel, Switzerland: Templ, M., Filzmoser, P., Hron, K. *Imputation of item non-responses in compositional data using robust methods*

5) Invited scientific presentations

a) at scientific institutions

Hron, K. *Applied compositional data analysis*. University of Jyväskylä, 17.-19.8.2022 (**summer school**)

Hron, K. *Statistical analysis of compositional data: fundamental concepts and recent developments*. Masaryk University, Brno, 29.3.2022 (invited lecture)

Hron, K. *Statistical analysis of compositional data*. Technical University of Ostrava, 12.11.2021 (invited lecture)

Hron, K. *Orthogonal decomposition and functional data analysis of bivariate densities in Bayes spaces*. Politecnico di Milano, 20.10.2021 (invited lecture)

Hron, K. *Regression analysis for multivariate compositional data using the logratio methodology*. University of Jyväskylä, online, 8.10.2021 (invited lecture)

Hron, K. *Orthogonal decomposition and analysis of bivariate densities in Bayes spaces*. Charles University, online, 31.3.2021 (invited lecture)

Hron, K. *Weighting of the domain in Bayes spaces: application to simplicial functional principal component analysis*. Lund University, 23.10.2019 (invited lecture)

Hron, K. *Weighting of densities in Bayes spaces with application to simplicial functional principal component analysis*, Weierstrass Institute, Berlin, 19.6.2019 (invited lecture)

Machalová, J., Hron, K. *Simplicial splines for representation of density functions*, Politecnico di Milano, 2.4.2019 (invited lecture)

Hron, K., Fačevicová, K. *From compositional data to compositional tables*, KU Leuven, 19.6.2018 (invited lecture)

Hron, K. *Regression analysis for compositional data using the logratio methodology*, University of Edinburgh, 23.6.2017 (invited lecture)

Hron, K. *Statistical methods for compositional data*, Politecnico di Milano, 4.4.2017 (short course)

Hron, K. *Statistical methods for compositional data*, University of Grodno, 21.3.2017 (short course)

Hron, K. *Linear regression with compositional explanatory variables and its application*, Karl Franzens University, Graz, 31.1.2017 (invited lecture)

Hron, K. *Robust compositional data analysis*, University of Girona, 7.7.2016 (short course)

Hron, K., Fišerová, E. *Classical and robust methods for compositional data*, University of Porto, 18.5.2016 (short course)

Hron, K. *Regression analysis for compositional data using the logratio approach*, TU Dortmund, 5.1.2016 (invited lecture)

Hron, K. *Regression analysis for compositional data using the logratio methodology*, Toulouse School of Economics, 17.11.2015 (invited lecture)

Hron, K., Filzmoser, P., Fišerová, E. *Linear regression with compositional explanatory variables*, University of Girona, 28.3.2012 (invited lecture)

b) at conferences

ERCIM 2020, online: Hron, K., Menafoglio, A., Palarea-Albaladejo, J., Filzmoser, P., Talská, R., Egozcue, J.J. *Weighting of parts in compositional data and its applications* (invited)

INTUE 2019, Olomouc, CZ: Hron, K. *Compositional data analysis: Fundamental concepts and recent developments* (keynote lecture)

Final CroNoS meetings & Workshop on Multivariate Data Analysis 2019, Limassol, Cyprus: Hron, K. *Applied compositional data analysis* (**invited short course**)

Biometria 2018, Aveiro, Portugal: Hron, K. *Biometry with compositional data* (invited short course)

COMPSTAT 2018, Iasi, Romania: [Hron, K.](#), Rendlová, J., Fačevicová, K. *Compositional tables and their coordinate representations* (invited)

TIES-GRASPA 2017, Bergamo, Italy: [Hron, K.](#), Filzmoser, P., Todorov, V. *Regression between parts of compositional data using symmetric balances* (invited)

ERCIM 2017, London, UK: [Hron, K.](#), Menafoglio, A., Filzmoser, P. *Logratio approach to modeling of densities with application to multivariate functional principal component analysis* (invited)

- COMPSTAT 2016, Oviedo, Spain: Hron, K., Filzmoser, P., Gardlo, A. *Univariate analysis of compositional data using weighted balances* (invited)
- ERCIM 2015, London, UK: Hron, K., Filzmoser, P. *Interpretation of outliers in compositional data using the R-package mvoutlier* (invited)
- ERCIM 2013, London, Great Britain: Hron, K., Fačevicová, K., Vencálek, O. *Statistical analysis of compositional tables in coordinates* (invited)
- SMPS 2012, Konstanz, Germany: Hron, K., Filzmoser, P.: *Robust diagnostics of fuzzy clustering results using the compositional approach* (invited)
- ERCIM 2012, Oviedo, Spain: Hron, K., Filzmoser, P., Templ, M., van den Boogaart, K.G., Tolosana-Delgado, R.: *A unified approach to classical and robust regression for compositional data* (invited)
- RSME 2011, Ávila, Spain: Hron, K., Filzmoser, P.: *Mathematical elements in robust statistics for CODA* (invited)
- SMPS 2010, Oviedo, Spain: Hron, K., Filzmoser, P. *Elements of robust regression for data with absolute and relative information* (invited)
- ERCIM'09, Limassol, Cyprus: Hron, K., Filzmoser, P., Reimann, C. *Robust principal components for compositional data* (invited)

A full list of conference contributions is available at
<https://kma.upol.cz/data/storage/source/8/publications2.pdf>.