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Main Research Areas

Biomedical sensors, measurement and signal processing, biomedical modeling and simulation, cellular electrophysiology and electrocardiology, patch clamp & multi electrode arrays (MEAs), clinical bioinformatics, data mining and computational modeling, computational methods for biomarker discovery

Education

2006 Venia docendi in Biomedical Engineering, thesis: "Knowledge discovery and data mining in biomedicine", UMIT, Hall in Tirol
1998 PhD (Dr.techn.) in Biomedical Engineering, thesis: "Measurement of cerebral perfusion using electron-beam computed tomography", TU & KFU Graz
1992-1998 Organ and conducting, Conservatory of Graz, University of Music and Performing Arts, Graz
1994 MSc (Dipl.-Ing.), in Electrical and Biomedical Engineering, TU Graz

Academic Milestones / Positions & Experience

2015 – Full Professor (Univ.-Prof., §98) and Head the Institute of Health Care Engineering with European Notified Body of Medical Devices, Graz University of Technology, Graz, Austria
2011 – 2015 Publicly Appointed and Sworn Consultant for Electrical/ Biomedical Engineering (Staatlich befugter und beeideter Ingenieurkonsulent für Elektrotechnik/Biomedizinische Technik, Befugnis ruhend)
2011 – 2015 Full Professor (Univ.-Prof., §98) and Director of the Institute of Electrical and Biomedical Engineering, Department of Biomedical Informatics and Mechatronics, University for Health Sciences, Medical Informatics and Technology (UMIT), Hall in Tirol, Austria
2010 – 2015 Vice Chair of the Department of Biomedical Informatics and Mechatronics, UMIT, Austria
2009 – 2011 Professor (Univ.-Prof., §99) and Director of the Institute of Electrical, Electronic and Bioengineering, Department of Biomedical Informatics and Mechatronics, UMIT, Austria
2008 – 2009 Interim Head of the Institute of Biomedical Engineering, Department of Biomedical Informatics and Mechatronics, UMIT, Austria
2007 – 2009 Associate Professor (ao.Univ.-Prof.) for Clinical Bioinformatics, UMIT, Austria
2007 – 2008 Visiting Research Scientist, Barnett Institute of Chemical and Biological Analysis, Northeastern University (Prof. Barry Karger), Boston, MA and Center for Immunology & Inflammatory Diseases, Massachusetts General Hospital, Harvard Medical School (Prof. Robert E. Gerszten), Boston, MA, USA
2004 – 2015 Head of the Research Group for Clinical Bioinformatics, Institute of Biomedical Engineering, UMIT, Austria
2003 – 2006 University Assistant, Institute of Biomedical Engineering and Institute of Information Systems, UMIT, Austria
1999 – 2003 R&D Systems Engineer, TECAN Austria GmbH, Salzburg, Austria, www.tecan.com
1995 – 1998 Research Assistant, General Department of Radiology, Graz Medical University, Austria

Research Achievements

61 original articles (SCI Impact factor >170), 2 books, 17 book chapters, 66 conference proceedings, >100 abstracts, posters, talks, 3 patents, h-index 22

Selected Journal Papers Christian Baumgartner

1. **Baumgartner C**, Spath-Blass V, Niederkofler V, Bergmoser K, Langthaler S, Lassnig A, Rienmüller T, Baumgartner D, Asnani A, Gerszten RE (2018). A novel network-based approach for discovering dynamic metabolic biomarkers in cardiovascular disease. *PLoS One*,13(12):e0208953 PMID: 30533038 [IF 3.06]
2. Handler M, Schier PP, Fritscher KD, Raudaschl P, Johnson Chacko L, Glueckert R, Saba R, Schubert R, Baumgarten D, **Baumgartner C** (2017). Model-based Vestibular Afferent Stimulation: Modular Workflow for Analyzing Stimulation Scenarios in Patient Specific and Statistical Vestibular Anatomy. *Front Neurosci,* 11:713 PMID: 29311790 [IF 3.56]
3. Kienast R, Handler M, Stöger M, Baumgarten D, Hanser F, **Baumgartner C** (2017). Modeling hypothermia induced effects for the heterogeneous ventricular tissue from cellular level to the impact on the ECG. *PLoS One*, 12(8):e0182979 PMID: 28813535 [IF 3.06]
4. Breit M, Netzer M, Weinberger KM, **Baumgartner C**. (2015) Modeling and Classification of Kinetic Patterns of Dynamic Metabolic Biomarkers in Physical Activity. *PLoS Comp Biol*, 11(8), e1004454. PMID:26317529 [IF 4.62]
5. Kienast R, Stöger M, Handler M, Hanser F, **Baumgartner C**. (2014) Alterations of field potentials in isotropic cardiomyocyte cell layers induced by multiple endogenous pacemakers under normal and hypothermal conditions, *Am J Physiol Heart Circ Physiol*, 307(7):H1013-23. PMID: 25085965 [IF 4.03]
6. Handler M, Fischer G, Seger M, Kienast R, Nowak CN, Pehböck D, Hintringer F, **Baumgartner C** (2013) Computer simulation of cardiac cryoablation: comparison with in-vivo data. *Med Eng Phys*, 35(12), 1754-1761. PMID: 23972331 [IF 2.226]
7. Berger T, Pfeifer B, Hanser F, HIntringer F, Fischer F, Netzer M, Trieb T, Stuehlinger M, Dichtl W, **Baumgartner C**, Pachinger O, Seger M (2011) Single-beat noninvasive imaging of ventricular endocardial and epicardial activation in patients undergoing CRT. *PLoS One*, 6:e16255. PMID: 21298045 [IF 4.351]
8. **Baumgartner C**, Lewis GD, Netzer M, Pfeifer B, Gerszten RE. (2010) A new data mining approach for profiling and categorizing kinetic patterns of metabolic biomarkers after myocardial injury. *Bioinformatics*, 26(14), 1745-1751. PMID: 20483816 [IF 4.926]
9. **Baumgartner C**, Rejtar T, Kullolli M, Akella LM, Karger BL. (2008) SeMoP: A New Computational Strategy for the Unrestricted Search for Modified Peptides Using LC-MS/MS Data. *J Proteome Res*, 7, 4199-4208. PMID: 18686985 [IF 5.684]
10. Lewis GD, Wei R, Liu E, Yang E, Shi X, Martinovic M, Farrell L, Asnani A, Cyrille M, Ramanathan A, Shaham O, Berriz G, Lowry PA, Palacios I, Tasan M, Roth FP, Min J, **Baumgartner C**, Keshishian H, Addona T, Mootha VK, Rosenzweig A, Carr SA, Fifer MA, Sabatine MS, Gerszten RE. (2008) Metabolite profiling of blood from individuals undergoing planned myocardial infarction reveals early markers of myocardial injury. *J Clin Invest*, 118, 3503-3512 PMID: 18769631[IF 16.558]

10 most important additional research achievements

1. Invited Talks and Keynotes (selected):

Harvard Medical Colloquium, BIMDC, Boston (2018), Biosensors Berlin (2017), Telocyte Forum, Shanghai (2016), Medical Colloquium, Wenzhou (2016), Biomarker Discovery Conference, Shoal Bay, Australia (2010), Harvard Medical Colloquium, MGH, Boston (2008), ISMB2004, Glasgow (2004), etc.

2. Chairman of Conferences/Advisory Board Member/Chair:

39th Annual Meeting of the Austrian Society for Biomedical Engineering (ÖGBMT'14), 37th Annual Meeting of the Austrian Society for Biomedical Engineering (ÖGBMT'12), 2nd Int. Conf. on Computational Bioscience (CompBio'11), 8th Int. Conf. on Biomedical Engineering (BioMed'11), Shanghai Institute of Clinical Bioinformatics (since 2013)

3. Reviewing (biomedical journals):

Advances in Artificial Neural Systems, Artificial Intelligence in Medicine, Bioanalysis, Biomedizinische Technik/Biomedical Engineering, Bioinformatics, BMC Genomics, BMC Bioinformatics, Briefings in Bioinformatics, Clinica Chimica Acta, Clinical Chemistry, Computer Methods and Programs in Biomedicine, Cryobiology, European Journal of Neurology, European Radiology, Expert Review of Proteomics, FEBS Journal, IEEE ACM Transactions on Computational Biology and Bioinformatics, IEEE Transactions on Medical Imaging, IEEE Transactions on Knowledge and Data Engineering, Genome Medicine, Journal of Biomedical Informatics, Journal of Breath Research, Journal of Clinical

Bioinformatics, Journal of Digital Imaging, Journal of Postgraduate Medicine, Journal of Proteomics Research, Knowledge-Based Systems, Medicine & Science in Sports & Exercise, Methods of Information in Medicine, Medical Engineering & Physics, Personalized Medicine, Proceedings of the National Academy of Sciences of the U.S.A. (PNAS), Proceedings of the IEEE, Recent Patents on Cardiovascular Drug Discovery, Source Code for Biology and Medicine, The Open Applied Informatics Journal, The Scientific World Journal, WIREs Data Mining & Knowledge Discovery

4. Research projects and funding (selected):

- Biomarkers in acute cardio-reno-metabolic disease states (2019-2022, WP HCE €220k, total project: €2,2M, *Financed by the Österreichische Forschungsförderungsgesellschaft mbH (FFG) within the Kompetenzzentrum COMED K1*
- VAMEL- Vestibular Anatomy Modeling and Electrode Design, WP2: Modeling and simulation (2013-2016, WP €150k, total project €1.2M) *Financed by the Tiroler Wissenschaftsfond,*
- CryoTipcatheter (WPs: biosensors, signal processing, modeling and simulation) (2010-2014, WP €360k, total project €1.1M) *Financed by the SAT and EFRE (EU),*
- GEN-AU Project: Bioinformatics Integration Network III (BIN III), Data Mining in Cancer and Cardiovascular Disease, Subproject 7 (2009 – 2011, €150k, total project €1,8M) *Financed by the Bundesministerium für Bildung, Wissenschaft und Kultur (bm:bwk),*
- IMGuS Pilot Project: Systems Biology of Prostate Cancer, Co-PI Subproject 7: Data Infrastructure (2006 – 2011, €330k) *Financed by Nationalstiftung für Forschung, Techn & Entwicklung and AWS,*
- GEN-AU Project: Bioinformatics Integration Network II (BIN II), Data Mining in Proteomics, Subproject 7 (2006 – 2009, €200k, total project €2,5M) *Financed by the Bundesministerium für Bildung, Wissenschaft und Kultur (bm:bwk),*
- KMT Project: Data Management / Data Analysis of PTR-MS relevant bioVOCs (2006 – 2009, €220k) *Financed by the Österreichische Forschungsförderungsgesellschaft mbH (FFG) within the Kompetenz-zentrum Medizin Tirol (KMT) program,*
- KMT Project: Data Mining of Key Parameters in the Human Exhalation Breath: Development of Algorithms, Data Base Design, Data Base Application and Visualization (2006 – 2009, €200k), *Financed by the Österreichische Forschungsförderungsgesellschaft mbH (FFG) within the Kompetenzzentrum Medizin Tirol (KMT) program,*
- GEN-AU Project: Bioinformatics Integration Network II (BIN II), Data Mining in Proteomics, Subproject 7 (2006 – 2008, IEBE WP €200k, total project €2.5M) *Financed by the Bundesministerium für Bildung, Wissenschaft und Kultur (bm:bwk),*

5. Important Awards

2017 order of merit for services rendered to the UMIT, Austria, 2008 Best Paper Award, BroadCom'08, South Africa, 2006 Max Kade fellowship, Austrian Academy of Sciences & Max Kade Foundation, USA, 2004 Selection of the article Baumgartner et al., *Bioinformatics*, 2004;20:2985-96 for IMIA Yearbook of Medical Informatics

6. Editor activity:

Cell Biology & Toxicology (Editorial Board Member 2016+), Methods of Information in Medicine (Editorial Board Member, 2010+), Clinical and Translational Medicine (Section Editor, 2012+), Journal of Clinical Bioinformatics (Deputy Editor, 2011 - 2015)

7. Membership in scientific societies:

Austrian Society for Biomedical Engineering (ÖGMBT), International Society for Computational Biology (ISCB)

8. PhD supervision

PhD supervisor ongoing: Sonja Langthaler, Katharina Bergmoser, Christoph Leitner, Karen Andrea Lara Hernandez
Finalized: Roland Kienast (2018), Niels Buchhold (2017), Michael Handler (2017), Klaus Donsa (2016), Marc Breit (2016), Fabio Ribeiro Cerqueira (2010), Michael Netzer (2010), Melanie Osl (2009), Claudia Plant (2006)

9. Teaching:

Cellular Electrophysiology (4,5 ECTS), Biomedical Sensors 1 (3 ECTS), Norms and Regulations for Medical Devices (3 ECTS), Principles of Electrical Engineering (5.5 ECTS), Electrical Measurement and Sensors (5 ECTS), Power and Drive Engineering (5 ECTS), Semiconductor Circuits and Design (5 ECTS), Biomedical Engineering 1 (3 ECTS), Biomedical Engineering Laboratory (1.5 ECTS), Biomedical Engineering 3 (2,5 ECTS), Data Mining in Biomedicine (6 ECTS), Algorithms in Bioinformatics (3 ECTS), Systems Biology (3 ECTS), Biophysics (3 ECTS), Scientific Working (1 ECTS)

10. Examples of leadership in industrial innovations

European Testing Center of Medical Devices (co-head, accredited according to EN17025, EN17065, EN17021, revenue 2015-2018: €1,0M, *Lancor Scientific Ltd.*, strategic collaboration with endowed professorship §98, 2019-2025.