

Konrad Werys

PhD student

contact

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languages

polish – mother tongue
english – fluency
spanish – intermediate

research interests

cardiac magnetic
resonance imaging
image processing
reconstruction

education

- 2011–Now **PhD student** – electronic engineering Warsaw University of Technology, Poland
Research field: *Motion estimation in cardiac magnetic resonance imaging*.
I am developing and analyzing motion estimation methods from cine and tagged magnetic resonance imaging.
- 2008–2010 **Master of Science** in electronic engineering Warsaw University of Technology, Poland
Thesis: *Cardiac strain measurement in tagged magnetic resonance imaging*.
I implemented and evaluated Harmonic Phase algorithm.
- 2004–2008 **Engineer** (Bachelor) in electronic engineering Warsaw University of Technology, Poland
Thesis: *Accuracy analysis of the stereovision system used for spine diagnosis*.
I analyzed accuracy of the infrared motion capture stereovision system.

experience

- 2010–Now **Institute of Cardiology** Warsaw, Poland
Medical Engineer
Maintenance of the magnetic resonance imaging equipment.
Research in field of cardiac magnetic resonance imaging.
- 2009–2010 **P.T.M. Anes-med** Warsaw, Poland
Field Service Engineer
User training, installation and periodic maintenance of anesthesia equipment (anesthesia systems, ventilators, vaporizers, vital signs monitors).

grants & stipends

- 2015 **Etiuda stipend** National Science Center, Poland
Topic: *Motion estimation in magnetic resonance imaging*.
6-month research visit at the **University of Auckland, New Zealand**.
- 2012–2013 **Principal investigator in statutory grant** Institute of Cardiology, Warsaw, Poland
Topic: *Are new strain evaluation methods useful?*
Evaluation of different strain estimation methods from both magnetic resonance imaging and echocardiography based on study of 20 healthy volunteers.
- 2012–2014 **3x Rector's stipend** Warsaw University of Technology, Poland
Award for best PhD students.
- 2012 **International exchange scholarship** Center of Advanced Studies, WUT, Poland
6-month research visit at the **University of Utah, USA**.

skills

- Matlab (my primary research tool), programming in C, C++, Objective C, Java
- sequence programming (Siemens IDEA course 2014)
- image reconstruction (Siemens ICE course 2014)

projects

- 2015–Now **The Sodium Lowering In Dialysate (SOLID) Trial**
University of Auckland, New Zealand
Purpose: *Study how dialysate choice impacts the left ventricle structure.*
My task is to develop methods of analyse cardiac T1 data and calculate circumferential strain from cardiac models.
- 2010–Now **Myocardium dyssynchrony evaluation**
Institute of Cardiology & Warsaw University of Technology, Poland
Purpose: *Predict the response to cardiac resynchronization therapy (CRT).*
My tasks:
- Implementation of image registration algorithms to estimate motion from cine magnetic resonance imaging [Wer+15a] - main part of my PhD thesis.
 - Development of dynamic phantom used to evaluate accuracy of motion estimation methods [Wer+15b; Cyg+14; WBC13; Wer13; BWC12].
 - Development of numeric phantoms used to evaluate motion estimation methods [Wer+12; Wer+11a].
 - Evaluation of different strain estimation methods from both magnetic resonance imaging and echocardiography based on study of 20 healthy volunteers. Speckle tracking was used to calculate strain from echocardiography. Harmonic Phase algorithm was used to calculate strain from tagged magnetic resonance images (both SPAMM and CSPAMM acquisition).
 - Analysis of myocardial deformation in study of 52 patients before cardiac resynchronization therapy (CRT). InTag software was used to calculate strain [Pet+11a; Wer+11b; Pet+11b].
 - Implementation of Harmonic Phase algorithm to estimate motion from tagged magnetic resonance imaging. Results were described in my master's thesis.
- 2012–2013 **Utah Collaborative Arrhythmia Project**
University of Utah, USA
Purpose: *Advance research and clinical treatments for cardiac arrhythmias, particularly atrial fibrillation.*
My first task was to develop strain measurement method to study progress of disease in animal models of chronic atrial fibrillation [Wer+13b].
My second task was to develop phase sensitive reconstruction method for 3d late gadolinium enhancement (LGE) acquisition [WK13].
- 2013–2014 **Visualization of blood flow patterns**
Institute of Cardiology, Warsaw, Poland
Purpose: *Evaluate blood flow patterns in patients after Fontan procedure.*
4d flow sequence from MRDAC - Freiburg was used for magnetic resonance data acquisition. My task was to acquire the data and postprocess it in Ensign software [Wer+13a; Kub+14a].
- 2010–2014 **Myocardial blood supply disorders in the coronary artery stenosis**
Institute of Cardiology & Warsaw University of Technology, Poland
Purpose: *Quantify myocardial blood supply.*
My task was to process the first-pass perfusion magnetic resonance data of 30 patients and compare qualitative and quantitative evaluation [Kub+14b; Kub+15].

interests

professional: magnetic resonance imaging, OsiriX plugin programming

personal: travel, capoeira

publications

article in peer-reviewed journal

- [Lip+15] Non-invasive cardiac imaging artifacts
Magdalena Lipczyńska, Ilona Michałowska, Konrad Werys, Magdalena Marczak, Marcin Lewandowski, Piotr Lipiec, Jarosław Kasprzak, Anna Klisiewicz, Piotr Szymański, Edyta Płońska-Gościńskiak
Polish Heart Journal 73 (Supp. V Dec. 2015) pp. 60–70. 2015
- [Mał+15] Native T1-mapping for non-contrast assessment of myocardial fibrosis in patients with hypertrophic cardiomyopathy — comparison with late enhancement quantification
Łukasz A. Małek, Konrad Werys, Mariusz Kłopotowski, Mateusz Śpiewak, Barbara Miłosz-Wieczorek, Łukasz Mazurkiewicz, Joanna Petryka-Mazurkiewicz, Magdalena Marczak, Adam Witkowski
Magnetic Resonance Imaging 33.6 (July 2015) pp. 718–724. 2015
- [Cyg+14] Left ventricle phantom and experimental setup for MRI and echocardiography – Preliminary results of data acquisitions
Szymon Cygan, Konrad Werys, Łukasz Błaszczyk, Tomasz Kubik, Krzysztof Kałużński
Biocybernetics and Biomedical Engineering 34.1 (Dec. 2014) pp. 19–24. 2014
- [Spi+12] Repaired Tetralogy of Fallot: Ratio of Right Ventricular Volume to Left Ventricular Volume as a Marker of Right Ventricular Dilatation
Mateusz Śpiewak, Łukasz A Małek, Joanna Petryka, Łukasz Mazurkiewicz, Konrad Werys, Elżbieta K Biernacka, Mirosław Kowalski, Piotr Hoffman, Marcin Demkow, Jolanta Misko, Witold Rużyłło
Radiology (July 12, 2012). 2012
- [Pet+11a] Magnetic resonance imaging assessment of intraventricular dyssynchrony and delayed enhancement as predictors of response to cardiac resynchronization therapy in patients with heart failure of ischaemic and non-ischaemic etiologies
Joanna Petryka, Jolanta Miśko, Andrzej Przybylski, Mateusz Śpiewak, Łukasz A Małek, Konrad Werys, Łukasz Mazurkiewicz, Katarzyna Gepner, Pierre Croisille, Marcin Demkow, Witold Rużyłło
European Journal of Radiology (Nov. 2011). 2011

conferences/proceedings

- [Wer+15d] Myocardial ShMOLLI T1 values are not significantly affected by GRAPPA or coil selection
Konrad Werys, Agata Kubik, Agnieszka Dąbrowska, Łukasz A Małek, Magdalena Marczak, Stefan K. Piechnik, Piotr Bogorodzki
32nd Annual Scientific Meeting of the of European Society for Magnetic Resonance in Medicine and Biology, 2015, Edinburgh, UK
- [Wer+15a] Gabor-Filter Based Longitudinal Strain Calculation
Konrad Werys, Łukasz Błaszczyk, Agata Kubik, Piotr Bogorodzki
The 8th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications, 2015, Warsaw, Poland
- [Wer+15b] Displacement field calculation from CINE MRI using non-rigid image registration
Konrad Werys, Łukasz Błaszczyk, Agata Kubik, Magdalena Marczak, Piotr Bogorodzki
The 8th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications, 2015, Warsaw, Poland
- [Wer+15e] Validation of the PVA cryogel with glycerol as a material for MRI phantoms
Konrad Werys, Katarzyna Pieniak, Beata Leśniak-Plewińska, Jakub Żmigrodzki, Szymon Cygan

The 8th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications, 2015, Warsaw, Poland

- [Kub+15] **Magnetic Resonance quantification of myocardial perfusion reserve using Fermi function model: comparison to visual qualification**
Tomasz Kubik, Konrad Werys, Krzysztof Mikołajczyk, Mateusz Śpiewak, Joanna Petryka-Mazurkiewicz, Jolanta Miśko
Mechatronics, 2015, Warsaw, Poland
- [Wer+15c] **Evaluation of cardiac motion in MRI**
Konrad Werys, Łukasz Błaszczyk, Agata Kubik, Magdalena Marczak, Piotr Bogorodzki
Warsaw Medical Physics Meeting, 2015, Warsaw, Poland
- [Pie+14] **Influence of heart rate on changes of the pulse pressure shape along the central arteries**
Marcin Pieniak, Konrad Werys, Tadeusz Pałko, Krzysztof Cieśllicki
Warsaw Medical Physics Meeting, 2014, Warsaw, Poland
- [Kub+14b] **Pipeline for quantification of myocardial perfusion reserve using Fermi function deconvolution method**
Tomasz Kubik, Konrad Werys, Jolanta Miśko, Krzysztof Mikołajczyk
Warsaw Medical Physics Meeting, 2014, Warsaw, Poland
- [Kub+14a] **Visualization of hemodynamic of the heart and large vessels with 4D Flow method in Magnetic Resonance Imaging (MRI)**
Agata Kubik, Magdalena Marczak, Łukasz Błaszczyk, Konrad Werys
Warsaw Medical Physics Meeting, 2014, Warsaw, Poland
- [WK13] **Phase-sensitive reconstruction to improve visualization of scar in LGE-MRI**
Konrad Werys, Eugene Kholmovski
30th Annual Scientific Meeting of European Society for Magnetic Resonance in Medicine and Biology, 2013, Toulouse, France
- [Wer+13a] **4D Velocity Mapping in Cardiovascular MRI**
Konrad Werys, Łukasz Błaszczyk, Agata Kubik, Łukasz Mazurkiewicz, Łukasz Małek, Mateusz Śpiewak, Jolanta Miśko, Magdalena Marczak
Advanced Bioimaging Technologies, 2013, Kraków, Poland
- [Wer13] **Fantom lewej komory serca**
Konrad Werys
VII Warsztaty Naukowe Centrum Studiów Zaawansowanych, 2013, Lipnik Park, Poland
- [WBC13] **Dynamic cardiac phantom for magnetic resonance imaging and ultrasonography**
Konrad Werys, Łukasz Błaszczyk, Szymon Cygan
International Society for Magnetic Resonance in Medicine 21st Annual Meeting and Exhibition, 2013, Salt Lake City, USA
- [Wer+13b] **CINE-MRI to study the progress of disease in a chronic atrial fibrillation goat model**
Konrad Werys, Sathya Vijayakumar, Ravi Ranjan, Derek Dossall, Daniel Kim, Nassir Marrouche, Eugene G. Kholmovski
Society for Cardiovascular Magnetic Resonance 16th Annual Scientific Sessions, 2013, San Francisco, USA
- [BWC12] **Left ventricle phantom for ultrasonography and magnetic resonance imaging.**
Łukasz Błaszczyk, Konrad Werys, Szymon Cygan
XLIV Ogólnopolskie Seminarium na temat magnetycznego rezonansu jądrowego i jego zastosowań, 2012, Kraków, Poland
- [Wer+12] **Comparison of myocardial strain estimation methods in tagged magnetic resonance imaging**
Konrad Werys, Łukasz Błaszczyk, Joanna Petryka, Ewa Piątkowska-Janko, Piotr Bogorodzki, Błażej Sawionek, Jolanta Miśko
International Symposium on Biomedical Imaging, 2012, Barcelona, Spain

- [Wer+11b] More severe left ventricular dyssynchrony derived from myocardial tagging in patients with non-ischaemic etiology of heart failure
Konrad Werys, Joanna Petryka, Karolina Stachewicz, Kamil Szwaba, Andrzej Przybylski, Mateusz Śpiewak, Łukasz Małek, Łukasz Mazurkiewicz, Witold Rużyłło, Jolanta Miśko
XV Międzynarodowy Kongres Polskiego Towarzystwa Kardiologicznego, 2011, Wrocław, Poland
- [Wer+11a] Methods of myocardial strain measurement in tagged magnetic resonance imaging
Konrad Werys, Łukasz Błaszczuk, Kamil Szwaba, Błażej Sawionek, Ewa Piątkowska-Janko, Piotr Bogorodzki, Jolanta Miśko
VI Kraków-Winnipeg Conference on Advanced Bioimaging Technologies, 2011, Kraków, Poland
- [Pet+11b] Higher degree of left intraventricular dyssynchrony derived from magnetic resonance myocardial tagging is associated with better combined clinical response in patients undergoing CRT-D implantation
Joanna Petryka, Jolanta Miśko, Konrad Werys, Andrzej Przybylski, Mateusz Śpiewak, Łukasz Mazurkiewicz, Łukasz Małek, Marcin Demkow, Witold Rużyłło
XV Międzynarodowy Kongres Polskiego Towarzystwa Kardiologicznego, 2011, Wrocław, Poland