Curriculum Vitae for Stephan Heunis

Name: Stephan Heunis
Position: Researcher, PhD candidate
Research field: Real-time neuroimage processing, reproducibility, data quality
Affiliation: Electrical Engineering, Eindhoven University of Technology, NL
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Links: Website, Twitter, Github, Google scholar

Tertiary Qualifications

Master of Science (Biomedical Engineering), Department of Mechanical and Mechatronic Engineering, Stellenbosch University, South Africa (2011 to 2012)

Bachelor of Engineering (Mechatronic), Department of Mechanical and Mechatronic Engineering, Stellenbosch University, South Africa (2007 to 2010)

Publications

Peer-reviewed journal articles:

Heunis, S., Lamerichs, R., Zinger, S., Aldenkamp, B., Breeuwer, M., 2018. Quality and denoising in real-time fMRI neurofeedback: a methods review. Human Brain Mapping. 2020; 41: 3439–3467. https://doi.org/10.1002/hbm.25010.

Botvinik-Nezer, R., Holzmeister, F., Camerer, C.F., Dreber, A., Huber, J., Johannesson, M., Kirchler, M., Iwanir, R., Mumford, J.A., Adcock, A., Avesani, P., Baczkowski, B., Bajracharya, A., Bakst, L., Ball, S., Barilari, M., Bault, N., Beaton, D., Beitner, J., Benoit, R., Berkers, R., Bhanji, J., Biswal, B., Bobadilla-Suarez, S., Bortolini, T., Bottenhorn, K., Bowring, A., Braem, S., Brooks, H., Brudner, E., Calderon, C., Camilleri, J., Castrellon, J., Cecchetti, L., Cieslik, E., Cole, Z., Collignon, O., Cox, R., Cunningham, W., Czoschke, S., Dadi, K., Davis, C., Luca, A.D., Delgado, M., Demetriou, L., Dennison, J., Di, X., Dickie, E., Dobryakova, E., Donnat, C., Dukart, J., Duncan, N.W., Durnez, J., Eed, A., Eickhoff, S., Erhart, A., Fontanesi, L., Fricke, G.M., Galvan, A., Gau, R., Genon, S., Glatard, T., Glerean, E., Goeman, J., Golowin, S., González-García, C., Gorgolewski, K., Grady, C., Green, M., Moreira, J.G., Guest, O., Hakimi, S., Hamilton, J.P., Hancock, R., Handjaras, G., Harry, B., Hawco, C., Herholz, P., Herman, G., **Heunis, S.**, Hoffstaedter, F., Hogeveen, J., Holmes, S., Hu, C.-P., Huettel, S., Hughes, M., Iacovella, V.,

Iordan, A., Isager, P., Isik, A.I., Jahn, A., Johnson, M., Johnstone, T., Joseph, M., Juliano, A., Kable, J., Kassinopoulos, M., Koba, C., Kong, X.-Z., Koscik, T., Kucukboyaci, N.E., Kuhl, B., Kupek, S., Laird, A., Lamm, C., Langner, R., Lauharatanahirun, N., Lee, H., Lee, S., Leemans, A., Leo, A., Lesage, E., Li, F., Li, M., Lim, P.C., Lintz, E., Liphardt, S., Vermeer, A.L., Love, B., Mack, M., Malpica, N., Marins, T., Maumet, C., McDonald, K., McGuire, J., Melero, H., Leal, A.M., Meyer, B., Meyer, K., Mihai, P., Mitsis, G., Moll, J., Nielson, D., Nilsonne, G., Notter, M., Olivetti, E., Onicas, A., Papale, P., Patil, K., Peelle, J.E., Pérez, A., Pischedda, D., Poline, J.-B., Prystauka, Y., Ray, S., Reuter-Lorenz, P., Reynolds, R., Ricciardi, E., Rieck, J., Rodriguez-Thompson, A., Romyn, A., Salo, T., Samanez-Larkin, G., Sanz-Morales, E., Schlichting, M., Schultz, D., Shen, Q., Sheridan, M., Shiguang, F., Silvers, J., Skagerlund, K., Smith, A., Smith, D., Sokol-Hessner, P., Steinkamp, S., Tashjian, S., Thirion, B., Thorp, J., Tinghög, G., Tisdall, L., Tompson, S., Toro-Serey, C., Torre, J., Tozzi, L., Truong, V., Turella, L., Veer, A.E. van't, Verguts, T., Vettel, J., Vijayarajah, S., Vo, K., Wall, M., Weeda, W.D., Weis, S., White, D., Wisniewski, D., Xifra-Porxas, A., Yearling, E., Yoon, S., Yuan, R., Yuen, K., Zhang, L., Zhang, X., Zosky, J., Nichols, T.E., Poldrack, R.A., Schonberg, T., 2020. Variability in the analysis of a single neuroimaging dataset by many teams. Nature 582, 84–88. https://doi.org/10.1038/s41586-020-2314-9

Tomas Ros, Stefanie Enriquez-Geppert*, Vadim Zotev, Kymberly Young, Guilherme Wood, Susan Whitfield-Gabrieli, Patrik Vuilleumier,Feng Wan, François Vialatte, Dimitri Van De Ville, Doron Todder, Tanju Surmeli, James Sulzer, Ute Strehl, Barry Sterman, Naomi Steiner, Bettina Sorger, Surjo Soekadar, Ranganatha Sitaram, Leslie Sherlin, Michael Schönenberg, Frank Scharnowski, Manuel Schabus, Katya Rubia, Agostinho Rosa, Miriam Reiners, Jaime Pineda, Christian Paret, Alexei Ossadtchi,Andrew Nicholson, Wenya Nan, Javier Minguez, Jean-Arthur Micoulaud-Franchi, David M. A. Mehler, Michael Lührs, Joel Lubar, Fabien Lotte, David E. J. Linden, Jarrod Lewis-Peacock, Mikhail Lebedev, Ruth Lanius, Andrea Kübler,Cornelia Kranczioch, Yury Koush, Lilian Konicar, Simon H. Kohl, Silivia E. Kober, Manousos Klados, Camille Jeunet, Tieme Janssen, Rene J. Huster, Kerstin Hoedlmoser, Laurence Hirshberg, **Stephan Heunis**, Talma Hendler, Michelle Hampson, Adrian Guggisberg, John Gruzelier, Rainer Göbel, Nicolas Gninenko, Alireza Gharabaghi, Paul Frewen, Thomas Fovet, Thalia Fernandez, Carlos Escolano, Ann-Christine Ehlis, Renate Drechsler, R Christopher deCharms, Stefan Debener, Dirk De Ridder, Eddy Davelaar, Marco Congedo, Marc Cavazza, Rien M. H. M. Breteler, Daniel Brandeis, Jerzy Bodurka, Niels Birbaumer, Olga Bazanova, Robert Bauer, Beatrix Barth, Panagiotis Bamidis, Tibor Auer, Martijn Arns, Robert T. Thibault. 2020. Consensus on the reporting and experimental design of clinical and cognitive-behavioural neurofeedback studies (CRED-nf checklist). Brain 143, 1674–1685. https://doi.org/10.1093/brain/awaa009

Heunis, S., Besseling, R., Lamerichs, R., de Louw, A., Breeuwer, M., Aldenkamp, B., Bergmans, J., 2018. Neu3CA-RT: A framework for real-time fMRI analysis. Psychiatry Research: Neuroimaging 282, 90–102. https://doi.org/10.1016/j.pscychresns.2018.09.008

Besseling, R., Lamerichs, R., Michels, B., **Heunis, S.**, de Louw, A., Tijhuis, A., Bergmans, J., Aldenkamp, B., 2018. Functional network abnormalities consistent with behavioral profile in Autism Spectrum Disorder. Psychiatry Research: Neuroimaging 275, 43–48. https://doi.org/10.1016/j.pscychresns.2018.02.006

Heunis, J.S., Scheffer, C. and Schreve, K., 2013, A User Interface for a Seven Degree of Freedom Surgical Robot. R&D Journal of SAIMechE, Vol. 29, pp. 44-54, ISSN 0257- 9669.

Preprints (under review):

Pernet, Cyril R., **Stephan Heunis**, Peer Herholz, and Yaroslav O. Halchenko. 2020. The Open Brain Consent: Informing Research Participants and Obtaining Consent to Share Brain Imaging Data. PsyArXiv. doi:10.31234/osf.io/f6mnp.

Peer-reviewed conference articles:

Dellimore, K., **Heunis, S.**, Gohier, F., Archer, E., Villiers, A. de, Smith, J., Scheffer, C., 2013. Development of a diagnostic glove for unobtrusive measurement of chest compression force and depth during neonatal CPR, in: 2013 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). pp. 350–353. https://doi.org/10.1109/EMBC.2013.6609509

Heunis, J.S., Scheffer, C., Schreve, K., 2012. A user interface for a seven degree of freedom surgical robot, in: 2012 5th Robotics and Mechatronics Conference of South Africa, pp. 1–6. https://doi.org/10.1109/ROBOMECH.2012.6558467

Conference abstracts/posters/demonstrations

Heunis, S., Hellrung, L., Meer, V.D., Bergert, S., Sladky, R., Pamplona, G.S.P., Scharnowski, F., Koush, Y., Mehler, D., Falcon, C., Gispert, J.D., Molinuevo, J.L., Skouras, S., 2019. rtQC: an open-source toolbox for real-time fMRI quality control. Poster and software demonstration at the 2019 annual meeting of the Organization of Human Brain Mapping. Rome, Italy.

Heunis, J.S., Lamerichs, R., Song, G., Zinger, S., Aldenkamp, B., 2019. Improving BOLD sensitivity with real-time multi-echo echo-planar imaging - Towards a cleaner neurofeedback signal. Poster at the 1th annual meeting of the Benelux Chapter of the International Society for Magnetic Resonance in Medicine. Leiden, The Netherlands.

Heunis, J.S., Besseling, R., Lamerichs, R., De Louw, A., Aldenkamp, B., Bergmans, J., 2018. Dynamic $T2^*$ and S0 mapping towards real-time multi-echo fMRI denoising. Poster at the

10th annual meeting of the Benelux Chapter of the International Society for Magnetic Resonance in Medicine. Antwerpen, Belgium.

Presentations and invited talks

Heunis, J.S. 2019. Real-time (fMRI) quality control. Invited lecture at the 2019 international real-time functional imaging and neurofeedback conference: rtFIN2019. Aachen, Germany.

Heunis, J.S. 2019. Building Open Science Communities. Invited talk at the 2019 Eurotech Summer School: Open Science in Practice. EPFL, Lausanne, Switzerland.

Heunis, J.S. 2019. Open Brain Consent - GDPR edition. Lightning talk at the 2019 meeting of the Society for the Improvement of Psychological Science. Rotterdam, The Netherlands.

Heunis, J.S. 2019. Real-time fMRI neurofeedback methodology: current challenges, possible solutions and future perspectives. Speaker during the session "Neurofeedback in psychiatry" at the 2019 annual Dutch Neuroscience Meeting. Lunteren, The Netherlands.

Heunis, J.S. 2019. Introduction to open science and OpenMR Benelux. Speaker and event host at the 1st annual meeting of the OpenMR Benelux community. Leiden, The Netherlands. (video link)

Heunis, J.S. 2018. Real-time fMRI neurofeedback - from technology to applications. Speaker and session moderator at the 11th annual Donders Discussions conference. The Donders Institute. Nijmegen, The Netherlands.

Heunis, J.S., Besseling, R., Lamerichs, R., De Louw, A., Aldenkamp, B., Bergmans, J., 2018. Dynamic T2* and S0 mapping towards real-time multi-echo fMRI denoising. Oral presentation at the 10th annual meeting of the Benelux Chapter of the International Society for Magnetic Resonance in Medicine. Antwerpen, Belgium.

Community building and leadership

Member of the OHBM Open Science Special Interest Group and **Open Science Room co-chair** for the 2020 annual conference of the Organization for Human Brain Mapping. Montréal, Canada.

Founder of OpenMR Benelux, a community promoting an open and inclusive research culture and transparent practices in the field of Magnetic Resonance Imaging in Medicine,

through annual events with talks, workshops and collaboration. Main organiser of the first OpenMR Benelux event (2019) and main advisor to the organising committee of the 2020 event (Nijmegen, The Netherlands) and planned 2021 event (virtual).

Organising committee member (and representative of the Eindhoven University of Technology) for the EuroTech Summer school: Open Science in Practice 2019. Lausanne, Switzerland.

Founder of the Open Science Community Eindhoven (OSC/e), a community of researchers and faculty at TU/e (representing multiple departments) working together to improve the adoption of transparent and reproducible practices across the research lifecycle.

Treasurer of the organising committee for the 11th annual meeting of the ISMRM Benelux chapter. Leiden, The Netherlands.

Director on the board of Stichting Solaris Onderzoek en Ontwikkeling, a non-profit organisation dedicated to supporting early career researchers.

Funding and awards

Mozilla Open Science Mini-Grant - USD10,000.
For organising the Avengers for Better Science workshop to help future research leaders learn to conduct research in an open and inclusive community. Shared grant.

Organization for Human Brain Mapping (OHBM) - USD500.
Travel grant for attending the 2019 annual OHBM hackathon and conference in Rome, Italy.

International Brain Research Organisation (IBRO) - EUR1000.
For organising the OpenMR Benelux (2019) event.

IEEE EMBS Benelux chapter - USD1000.
For organising the OpenMR Benelux (2019) event.

Independently developed research collaborations

Theme: *multi-echo functional MRI processing methods and denoising*

Cesar Caballero Gaudes, PhD
Basque Center on Cognition, Brain and Language. Donostia, Spain.

Theme: *real-time functional MRI processing and quality control software*

Stavros Skouras, PhD
University of Bergen, Norway.

Lydia Hellrung, PhD
University of Zürich, Switzerland.

Johan van der Meer, PhD
QIMR Berghofer Medical Research Institute. Brisbane, Australia.

Yury Koush, PhD
Yale University, USA.

Theme: *transparent and reproducible research methods in functional MRI*

Peder Isager
Eindhoven University of Technology, The Netherlands

Remi Gau, PhD
UC Louvain, Belgium

David Mehler, PhD
University of Münster, Germany

Robert Thibault, PhD
University of Bristol, UK

Work experience

Software programmer, Eindhoven University of Technology (2019-2020)
Translation of biomedical image processing course material from Matlab to Python.

Researcher and PhD candidate, Eindhoven University of Technology (2017-2020/2021)
Researching signal processing and data quality control methods in the field of real-time functional MRI, towards the investigation of neurofeedback treatment in clinical practice.

Head of Solution Delivery, JourneyApps Inc. South Africa (2015-2016)
Leading a team of 9 software engineers in the process of delivering "Software as a Service" enterprise mobile applications to customers worldwide.

Solution Delivery Engineer, JourneyApps Inc. South Africa (2014-2015)
Designing and building enterprise mobility software applications for customers across multiple industries worldwide, using the JourneyApps development platform.

Commercial Engineer, Rockwell Automation. South Africa (2013-2014)
Pre-sales technical support of the EMEA (Europe, Middle East, Africa) sales team selling hardware and software control systems products to large companies in the food and beverage industry.

Research Engineer, Stellenbosch University. South Africa (2012-2013)
Technical design, literature research, laboratory testing, and academic writing.

Skills

Programming/scripting experience:

- Matlab (10 years)
- Python (1.5 years)
- Javascript (2 years)
- HTML+CSS (1 year)
- Plotly Dash (8 months)
- Shell scripting (2 years)

Computing:

- Binder for cloud computing
- HPC for scientific data analysis

Transparent research tools and practices:

- Software version control with git and GitHub
- Jupyter Notebooks, Lab, Books
- Neuroimage data curation with the BIDS standard
- Neuroimage data sharing

Project/team management:

- Agile software development processes (2 years)
- Working in a team of software engineers (2 years)
- Team leader experience (1 year)
- General engineering project management (4 years)