

# CV – Christof Seiler

Department of Advanced Computing Sciences, Maastricht University, NL, and  
Department of Rheumatology, University Hospital Zurich, University of Zurich, CH  
<https://christofseiler.github.io/>

## Education

|                 |  |
|-----------------|--|
| 01/2013–12/2017 | Stanford University, CA, US<br>Advisor: Susan Holmes<br>Postdoctoral Fellow in Statistics  |
| 07/2008–09/2012 | Inria, FR & University of Bern, CH<br>Advisors: Xavier Pennec & Mauricio Reyes<br>PhD in Computer Science & Biomedical Engineering |
| 02/2006–07/2008 | University of Bern, CH<br>MSc in Biomedical Engineering  |
| 09/2001–01/2006 | University of Applied Sciences, Biel, CH<br>Dipl. Ing. FH (equivalent to BSc) in Computer Science                                  |

## Employment and Visiting Appointments

|                 |  |
|-----------------|--|
| 09/2023–present | Principal Investigator,<br>Center of Experimental Rheumatology, Department of Rheumatology,<br>University Hospital Zurich, University of Zurich, CH                          |
| 10/2018–present | Assistant Professor of Statistics (with tenure since 01/2022),<br>Department of Advanced Computing Sciences, and<br>Mathematics Centre Maastricht, Maastricht University, NL |
| 11/2022–01/2023 | Academic Guest, Hosted by Bjoern Menze,<br>Department of Quantitative Biomedicine, University of Zurich, CH  |
| 01/2018–07/2018 | Research Scientist in Statistics,  |
| 01/2013–12/2017 | Postdoctoral Researcher in Statistics,<br>Department of Statistics, Stanford University, CA, US  |
| 03/2017–05/2017 | EPFL-Stanford Exchange Fellow, Hosted by Dimitri Van De Ville,<br>EPFL, Lausanne, CH   |
| 10/2010–09/2012 | Doctoral Researcher, Asclepios Research Group, Inria Sophia Antipolis, FR  |
| 07/2008–09/2012 | Doctoral Researcher,<br>Institute for Surgical Technology and Biomechanics, University of Bern, CH   |
| 09/2010–12/2010 | Visiting Graduate Fellow,<br>Statistical and Applied Mathematical Sciences Institute, Durham, NC, US   |
| 12/2006–05/2008 | Software Engineer, Integrated Scientific Services AG, Biel, CH   |
| 02/2006–12/2006 | Software Engineer,<br>Institute for Evaluative Research in Medicine, University of Bern, CH  |
| 02/2005–04/2005 | Software Engineering Consultant (remote), Oridus Inc., Fremont, CA, US   |
| 09/2003–08/2004 | Software Engineering Intern, Oridus Inc., Fremont, CA, US  |

## Grants

|                 |  |
|-----------------|--|
| 09/2024–08/2026 | DSI Infrastructure and Lab Program, University of Zurich, CH<br>Role: PI / Amount: \$110,000<br>Project: RAI Platform – Reliable AI for Biomedicine                      |
| 01/2023–12/2027 | ERC Starting Grant, NL<br>Role: Senior statistician / Amount: \$60,000<br>Project: Treatment of irritable bowel syndrome by neuromodulation                              |
| 01/2023–01/2025 | MLDS – Dutch Foundation for Gastrointestinal Disorders, NL<br>Role: Senior statistician / Amount: \$16,000<br>Project: Data-driven treatment of irritable bowel patients |
| 09/2013–08/2014 | France-Stanford collaborative project grant, FR<br>Role: Coordinator / Amount: \$14,850<br>Project: Statistical analysis of CT images of lower back pain patients        |

## Fellowships

|                 |   |
|-----------------|---|
| 03/2017–05/2017 | EPFL-Stanford exchange program fellowship, CH<br>Role: Main applicant / Amount: \$11,000<br>Project: Reproducibility and transparency in neuroimaging                   |
| 01/2015–12/2015 | Swiss NSF Fellowship for Advanced Researchers, CH<br>Role: Main applicant / Amount: \$49,400<br>Project: Monte Carlo methods in computational anatomy                   |
| 01/2013–12/2014 | Swiss NSF Fellowship for Prospective Researchers, CH<br>Role: Main applicant / Amount: \$89,000<br>Project: Uncertainty in computational anatomy                        |
| 08/2010–09/2012 | Swiss SERI scholarship for joint PhD in FR and CH<br>Role: Main applicant / Amount: \$10,000<br>Project: PhD thesis on modeling of organ deformations in medical images |

## Awards

|      |   |
|------|---|
| 2016 | ISBA new researchers travel award, Sardinia, IT<br>(gratefully declined)  |
| 2015 | Conference on Bayesian Nonparametrics travel award, Raleigh, NC, US   |
| 2011 | MICCAI Young Scientist Award, Toronto, CA<br>(top 5 of about 819 submitted papers by PhD students and postdocs) |
| 2011 | MICCAI student travel award, Toronto, CA  |

## Supervision and Mentoring

|                 |                                    |
|-----------------|------------------------------------|
|                 | <b>Maastricht University</b>       |
| 09/2019–        | MSc theses (27 students)           |
| 09/2019–        | MSc internships (32 students)      |
| 09/2018–        | BSc theses (14 students)           |
| 09/2018–        | BSc internships (7 students)       |
|                 | <b>Stanford University</b>         |
| 09/2016–08/2018 | Diana Proctor, Postdoctoral Fellow |
| 09/2016–08/2018 | BSc thesis (1 student)             |
|                 | <b>University of Bern</b>          |
| 09/2009–02/2010 | BSc thesis (1 student)             |

## Open Source Software Contributions

|      |  |
|------|--|
|      | <b>R packages:</b>   |
| 2023 | <a href="#">spillR</a> : Spillover compensation in mass cytometry data                       |
| 2019 | <a href="#">CytoGLMM</a> : Conditional differential analysis for cytometry experiments       |
| 2019 | <a href="#">cytoeffect</a> : Multivariate regression for cytometry experiments               |
| 2017 | <a href="#">CovRegFC</a> : Multivariate heteroscedasticity models for fMRI                   |
| 2017 | <a href="#">braincog</a> : Differential correlation analysis between MRI and cognitive tests |
| 2017 | <a href="#">curvature</a> : Convergence diagnosis of Hamiltonian Monte Carlo                 |
|      | <b>C++, C, and C for Graphics (Cg) tools:</b>  |
| 2015 | Bayesian medical image registration ( <a href="#">git repository</a> )                       |
| 2014 | Bayesian nonparametric clustering for medical images ( <a href="#">git repository</a> )      |
| 2012 | Tree structured medical image registration ( <a href="#">git repository</a> )                |
| 2009 | Markov random fields on the GPU ( <a href="#">git repository</a> )                           |
|      | <b>MATLAB workflow:</b>  |
| 2012 | Cell shape classifier for time-lapse microscopy ( <a href="#">git repository</a> )           |

## Teaching

|                 |  |
|-----------------|--|
|                 | <b>Courses at Maastricht University</b>  |
| 09/2019–        | KEN4258 Computational Statistics (MSc): Designer & lecturer  |
| 09/2019–        | KEN2130 Probability and Statistics (BSc): Designer & lecturer  |
| 09/2018–08/2022 | KEN1520 Software Engineering (BSc): Co-designer & co-lecturer  |
| 09/2018         | MAT2006 Calculus (BSc): Lecturer   |
| 09/2018         | Data Science School (BSc/MSc/PhD/Postdoc): Co-designer & co-lecturer   |
|                 | <b>Courses at Stanford University</b>  |
| 09/2016–08/2018 | STATS 366/BIOS 221 Modern Statistics for Modern Biology (PhD/Postdoc): Teaching assistant & guest lecturer       |
| 09/2015         | STATS 205 Introduction to Nonparametric Statistics (MSc): Designer & lecturer ( <a href="#">course website</a> ) |
|                 | <b>Courses at ETH Zurich and University of Bern</b>  |
| 09/2008–08/2010 | Medical Image Analysis (MSc): Guest lecturer   |

## Reviewer for Journals, Conferences, and Grants

|            |   |
|------------|---|
| Since 2024 | Biostatistics   |
| Since 2022 | MIDL (Medical Imaging with Deep Learning)                           |
| Since 2021 | MELBA (Machine Learning for Biomedical Imaging)                     |
| Since 2020 | Electronic Journal of Statistics                                    |
| Since 2019 | Journal of Machine Learning Research                                |
| Since 2014 | Annals of Applied Statistics  |
| Since 2012 | IPMI (Information Processing in Medical Imaging)                    |
| 2024       | NWO Rubicon Postdoctoral Fellowships                                |
| 2020–2022  | Briefings in Bioinformatics   |
| 2021       | IEEE Journal of Biomedical and Health Informatics                   |
| 2019       | Journal of Computational and Graphical Statistics, Neurocomputing   |
| 2013       | Medical Image Analysis  |
| 2012–2017  | MICCAI (Medical Image Computing and Computer Assisted Intervention) |

## Invited and Contributed Talks

|         |   |
|---------|---|
| 10/2024 | ReproducibiliTea, University of Basel, CH                             |
| 10/2024 | Statistics Seminar, McMaster University, Hamilton, ON, CA             |
| 09/2024 | Swiss Statistics Meeting, Aarau, CH                                   |
| 07/2024 | ASML, Veldhoven, NL   |
| 04/2024 | Wagi Lunch Seminar, University of Zurich, Schlieren, CH               |
| 06/2023 | Workshop on Bayesian Inversion, Macolin, CH                           |
| 02/2023 | Institute of Neuropathology, University Hospital Zurich, CH           |
| 02/2023 | Department of Quantitative Biomedicine, University of Zurich, CH      |
| 09/2020 | Department of Methodology and Statistics, Maastricht University, NL   |
| 10/2019 | Second Dutch Stan Meetup 2019, Utrecht, NL                            |
| 09/2019 | Basel Life, Basel, CH   |
| 12/2018 | Data Science Research Seminar, Maastricht University, NL              |
| 03/2018 | Department of Statistics, LMU, Munich, DE                             |
| 02/2018 | School of Mathematical Sciences, Queen Mary University of London, UK  |
| 05/2017 | Workshop on Statistical Challenges in Single-Cell Biology, Ascona, CH |
| 04/2017 | Division of Immunology and Allergy, CHUV, Lausanne, CH                |
| 04/2017 | CyTOF Working Group, Stanford University, CA, US                      |
| 03/2017 | MIP:Lab, EPFL, Campus Biotech, Geneva, CH                             |
| 03/2017 | Bioinformatics Core Facility, SIB, Lausanne, CH                       |
| 6/2015  | Conference on Bayesian Nonparametrics, Raleigh, NC, US                |
| 3/2015  | Center for Imaging Science, Johns Hopkins, Baltimore, MD, US          |
| 10/2014 | Workshop in Biostatistics, Stanford School of Medicine, CA, US        |
| 8/2014  | JSM (Joint Statistical Meetings), Boston, MA, US                      |
| 5/2014  | Inria Sophia Antipolis, Sophia Antipolis, FR                          |
| 3/2014  | Institut de Mathématiques de Toulouse, Université Paul Sabatier, FR   |
| 10/2013 | Departement of Statistics, Stanford University, CA, US                |
| 8/2013  | Geometric Science of Information, Paris, FR                           |
| 3/2013  | Computational People United at Stanford, CA, US                       |
| 3/2013  | Artorg Center, University of Bern, CH                                 |
| 9/2011  | MICCAI, Toronto, ON, CA   |
| 2/2011  | SPIE Medical Imaging, Orlando, FL, US                                 |
| 6/2010  | TERMIS, Galway, IE  |
| 6/2009  | CAOS, Boston, MA, US  |
| 12/2008 | 3D Physiological Human, Zermatt, CH                                   |

## List of Publications

Same list with links to articles: <https://christofseiler.github.io/research/>

## Peer-Reviewed Journal Articles

1. **spillR**: Spillover Compensation in Mass Cytometry Data  
M. Guazzini, A. Reisach, S. Weichwald, and **C. Seiler**  
Bioinformatics, Volume 40, Issue 6, btae337, June 2024
2. Multipotent Adult Progenitor Cells Prevent Functional Impairment and Improve Development in Inflammation Driven Detriment of Preterm Ovine Lungs  
S. Neuen, D. Ophelders, H. Widowski, M. Hütten, T. Brokken, C. van Gorp, P. Nikkels, C. Severens-Rijvers, M. Sthijns, C. van Blitterswijk, F. Troost, V. LaPointe, S. Jolani, **C. Seiler**, J. Pillow, T. Delhaas, N. Reynaert, and T. Wolfs  
Regenerative Therapy, Volume 27, Pages 207–217, December 2024

3. **CytoGLMM: Conditional Differential Analysis for Flow and Mass Cytometry Experiments**  
**C. Seiler**, A.-M. Ferreira, L. Kronstad, L. Simpson, M. Le Gars, E. Vendrame, C. Blish, and S. Holmes  
 BMC Bioinformatics, Volume 22, Article 137, Pages 1–14, March 2021
4. **Natural Killer Cell Phenotype is Altered in HIV-Exposed Seronegative Women**  
 N. Zhao, E. Vendrame, A.-M. Ferreira, **C. Seiler**, T. Ranganath, M. Alary, A.-C. Labbé, F. Guédou, J. Poudrier, S. Holmes, M. Roger, and C. Blish  
 PLOS ONE, Volume 15, Issue 9, Pages 1–17, September 2020
5. **Characterization of the Impact of Daclizumab Beta on Circulating Natural Killer Cells by Mass Cytometry**  
 T. Ranganath, L. Simpson, A.-M. Ferreira, **C. Seiler**, E. Vendrame, N. Zhao, J. Fontenot, S. Holmes, and C. Blish  
 Frontiers in Immunology, Volume 11, Article 714, Pages 1–13, April 2020
6. **Influenza-Induced Interferon Lambda Response Is Associated with Longer Time to Delivery Among Pregnant Kenyan Women**  
**C. Seiler**, N. Bayless, R. Vergara, J. Pintye, J. Kinuthia, L. Osborn, D. Matemo, B. Richardson, G. John-Stewart, S. Holmes, and C. Blish  
 Frontiers in Immunology, Volume 11, Article 452, Pages 1–10, March 2020
7. **TIGIT is Upregulated by HIV-1 Infection and Marks a Highly Functional Adaptive and Mature Subset of Natural Killer Cells**  
 E. Vendrame, **C. Seiler**, T. Ranganath, N. Zhao, R. Vergara, M. Alary, AC. Labbé, F. Guédou, J. Poudrier, S. Holmes, M. Roger, and C. Blish  
 AIDS, Volume 34, Issue 6, Pages 801–813, May 2020
8. **Pregnancy-Induced Alterations in NK Cell Phenotype and Function**  
 M. Le Gars, **C. Seiler**, A. Kay N. Bayless, E. Starosvetsky, L. Moore, S. Shen-Orr, N. Aziz, P. Khatri, C. Dekker, G. Swan, M. Davis, S. Holmes, and C. Blish  
 Frontiers in Immunology, Volume 10, Article 2469, Pages 1–13, October 2019
9. **Differential Induction of IFN- $\alpha$  and Modulation of CD112 and CD54 Expression Govern the Magnitude of NK Cell IFN- $\gamma$  Response to Influenza A Viruses**  
 L.M. Kronstad, **C. Seiler**, R. Vergara, S. Holmes, and C. Blish,  
 The Journal of Immunology, Volume 201, Issue 7, Pages 2117–2131, October 2018
10. **Multi-Table Differential Correlation Analysis of Neuroanatomical and Cognitive Interactions in Turner Syndrome**  
**C. Seiler**, T. Green, D. Hong, L. Chromik, L. Huffman, S. Holmes, and A.L. Reiss  
 Neuroinformatics, Volume 16, Issue 1, Pages 81–93, January 2018
11. **Multivariate Heteroscedasticity Models for Functional Brain Connectivity**  
**C. Seiler** and S. Holmes  
 Frontiers in Neuroscience, Volume 11, Article 696, Pages 1–11, December 2017
12. **Image-based vs. Mesh-based Statistical Appearance Model of the Human Femur: Implications for Finite Element Simulations**  
 S. Bonaretti, **C. Seiler**, C. Boichon, M. Reyes, and P. Büchler  
 Medical Engineering and Physics, Volume 36, Issue 12, Pages 1626–1635, December 2014
13. **Time-Lapse Microscopy and Classification of 2D Human Mesenchymal Stem Cells Based on Cell Shape Picks Up Myogenic from Osteogenic and Adipogenic Differentiation**  
**C. Seiler**, A. Gazdhar, M. Reyes, L.M. Benneker, T. Geiser, K.A. Siebenrock, and B. Gantenbein-Ritter

Journal of Tissue Engineering and Regenerative Medicine,  
Volume 8, Issue 9, Pages 737–746, September 2014

14. Discussion of “Geodesic Monte Carlo on Embedded Manifolds”  
P. Diaconis, **C. Seiler**, and S. Holmes  
Scandinavian Journal of Statistics, Volume 41, Issue 1, Pages 3–7, March 2014
15. Validity of an Automatic Measure Protocol in Distal Femur for Allograft Selection from a Three-Dimensional Virtual Bone Bank System  
L. Ritacco, **C. Seiler**, G. Farfalli, L. Nolte, M. Reyes, D. Muscolo, and L. Tinai  
Cell and Tissue Banking, Volume 14, Issue 2, Pages 213–220, June 2013
16. Capturing the Multiscale Anatomical Shape Variability with Polyaffine Transformation Trees  
**C. Seiler**, X. Pennec, and M. Reyes  
Medical Image Analysis, Volume 16, Issue 7, Pages 1371–1384, October 2012
17. Statistical Model Based Shape Prediction from a Combination of Direct Observations and Various Surrogates: Application to Orthopaedic Research  
R. Blanc, **C. Seiler**, G. Székely, L. Nolte, and M. Reyes  
Medical Image Analysis, Volume 16, Issue 6, Pages 1156–1166, August 2012

#### Peer-Reviewed Conference and Workshop Papers

1. Simple Sorting Criteria Help Find the Causal Order in Additive Noise Models  
A. Reisach, M. Tami, **C. Seiler**, A. Chambaz, and S. Weichwald  
NeurIPS, New Orleans, LA, US, Pages 785–807, December 2023
2. Conformal Regression in Calorie Prediction for Team Jumbo–Visma  
K. van Kuijk, M. Dirksen, **C. Seiler**  
COPA, Limassol, CY, PMLR, Volume 204, Pages 5–15, September 2023
3. Beware of the Simulated DAG! Causal Discovery Benchmarks May Be Easy to Game  
A. Reisach, **C. Seiler**, and S. Weichwald  
NeurIPS, Virtual-only Conference, Pages 27772–27784, December 2021
4. Positive Curvature and Hamiltonian Monte Carlo  
**C. Seiler**, S. Rubinstein-Salzedo, and S. Holmes  
NIPS (now NeurIPS), Montreal, CA, Pages 586–594, December 2014
5. Spatio-Temporal Dimension Reduction of Cardiac Motion for Group-Wise Analysis and Statistical Testing  
K. McLeod, **C. Seiler**, M. Sermesant, and X. Pennec  
MICCAI, Nagoya, JP, LNCS, Volume 8150, Part II, Pages 501–508, September 2013
6. Random Spatial Structure of Geometric Deformations and Bayesian Nonparametrics  
**C. Seiler**, X. Pennec, and S. Holmes  
GSI, Paris, FR, LNCS, Volume 8085, Part III, Pages 120–127, August 2013
7. Regional Analysis of Left Ventricle Function using a Cardiac-Specific Polyaffine Motion Model  
K. McLeod, **C. Seiler**, Nicolas Toussaint, M. Sermesant, and X. Pennec  
FIMH, London, UK, LNCS, Volume 7945, Pages 483–490, June 2013
8. Simultaneous Multiscale Polyaffine Registration by Incorporating Deformation Statistics  
**C. Seiler**, X. Pennec, and M. Reyes  
MICCAI, Nice, FR, LNCS, Volume 7511, Part II, Pages 130–137, October 2012

9. Population-Based Design of Mandibular Plates Based on Bone Quality and Morphology  
H. Bou-Sleiman, **C. Seiler**, T. Iizuka, L. Nolte, and M. Reyes  
MICCAI, Nice, FR, LNCS, Volume 7510, Part I, Pages 66–73, October 2012
10. A Near-Incompressible Poly-Affine Motion Model for Cardiac Function Analysis  
K. McLeod, **C. Seiler**, A. Prakosa, M. Sermesant, and X. Pennec  
STATCOM Workshop, MICCAI, Nice, FR, October 2012
11. Geometry-Aware Multiscale Image Registration Via OBBTree-Based Polyaffine Log-Demons  
**C. Seiler**, X. Pennec, and M. Reyes  
MICCAI, Toronto, CA, LNCS, Volume 6892, Part II, Pages 631–638, September 2011
12. Mesh-based vs. Image-based Statistical Model of Appearance of the Human Femur: A Preliminary Comparison Study for the Creation of Finite Element Meshes  
S. Bonaretti, **C. Seiler**, C. Boichon, P. Büchler, and M. Reyes  
MeshMed Workshop, MICCAI, Toronto, CA, September 2011
13. Femur Specific Polyaffine Model to Regularize the Log-domain Demons Registration  
**C. Seiler**, X. Pennec, L. Ritacco, and M. Reyes  
SPIE Medical Imaging (Image Processing), Orlando, US, February 2011
14. Atlas-Based Segmentation of Brain Tumor Images Using a Markov Random Field-Based Tumor Growth Model and Non-Rigid Registration  
S. Bauer, **C. Seiler**, T. Bardyn, P. Büchler, and M. Reyes  
EMBC, Buenos Aires, AR, Pages 4080–4083, September 2010
15. Parametric Regression of 3D Medical Images Through the Exploration of Non-Parametric Regression Models  
**C. Seiler**, X. Pennec, and M. Reyes  
ISBI, Rotterdam, NL, Pages 452–455, April 2010
16. Combined Statistical Model of Bone Shape and Mechanical Properties for Bone and Implant Modeling  
S. Bonaretti, M. Kistler, **C. Seiler**, M. Reyes, and P. Büchler  
CMBBE, Valencia, ES, February 2010
17. Conditional Variability of Statistical Shape Models Based on Surrogate Variables  
R. Blanc, M. Reyes, **C. Seiler**, and G. Székely  
MICCAI, London, UK, LNCS, Volume 5762, Part II, Pages 84–91, September 2009

### Peer-Reviewed Book Chapters

1. Bayesian Statistics in Computational Anatomy  
**C. Seiler**  
Statistical Shape and Deformation Analysis: Methods, Implementations & Applications (G. Zheng, S. Li, and G. Székely, eds.), Chapter 8, Academic Press, March 2017, Pages 193–214
2. Hierarchical Markov Random Fields Applied to Model Soft Tissue Deformations on Graphics Hardware  
**C. Seiler**, P. Büchler, L.-P. Nolte, R. Paulsen, and M. Reyes  
Recent Advances in the 3D Physiological Human (N. Magnenat-Thalmann, J.J. Zhang, and D.D. Feng, eds.), Chapter 9, Springer London, July 2009, Pages 133–148

## Unrefereed Preprints

1. NKp30 and NKG2D Contribute to Natural Killer Recognition of HIV-Infected Cells  
N. Zhao, R. Pi, Ruoxi, D. Nguyen, T. Ranganath, **C. Seiler**, S. Holmes, A. Marson, and C. Blish  
<https://doi.org/10.1101/2024.06.24.600449>
2. Spatial Patterns of Dental Disease in Patients with Low Salivary Flow  
D. Proctor, **C. Seiler**, A. Burns, S. Walker, T. Jung, J. Weng, S. Sastiel, Y. Rajendran, Y. Kapila, M. Millman, G. Armitage, P. Loomer, S. Holmes, M. Ryder, and D. Relman  
<https://doi.org/10.1101/2021.10.04.21264534>
3. Uncertainty Quantification in Multivariate Mixed Models for Mass Cytometry Data  
**C. Seiler**, L. Kronstad, L. Simpson, M. Le Gars, E. Vendrame, C. Blish, and S. Holmes  
<https://arxiv.org/abs/1903.07976>
4. CD38 Contributes to Human Natural Killer Cell Responses Through a Role in Immune Synapse Formation  
M. Le Gars, **C. Seiler**, A. Kay, N. Bayless, E. Sola, E. Starosvetsky, L. Moore, S. Shen-Orr, N. Aziz, P. Khatri, C. Dekker, G. Swan, M. Davis, S. Holmes, Catherine A. Blish  
<https://doi.org/10.1101/349084>
5. Curvature and Concentration of Hamiltonian Monte Carlo in High Dimensions  
S. Holmes, S. Rubinstein-Salzedo, and **C. Seiler**  
<https://arxiv.org/abs/1407.1114>