

CURRICULUM VITAE

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CURRENT POSITION

- ◇ University Lecturer, University of Gothenburg (GU). 2012/12/12 -
(Parental leave Feb 2013 – Sept 2013 and Feb 2015 – Sept 2015)

PREVIOUS POSITIONS

- ◇ Researcher, (GU). 2012/1/1–2012/12/11
- ◇ University Lecturer, LTH, Lund University. 2011/7/1–2012/6/30
- ◇ Part-time lecturer, Chalmers University of Technology (CTH). 2011/7/1–2011/12/31
- ◇ Post-doc, University of Oslo, Norway. 2010/4/1–2011/4/30
- ◇ Part-time lecturer, CTH. 2010/1/1–2010/3/31
- ◇ Post-doc, University of Vienna, Austria. 2009/11/1–2009/11/31
- ◇ Post-doc, GU. 2007/11/1–2009/10/31
- ◇ Post-doc, Institut Mittag-Leffler, Djursholm, Stockholm. 2008/1/15–2008/6/15
- ◇ Post-doc, University of Wuppertal, Germany. 2006/1/1–2007/10/31
Supported by Vetenskapsrådet, VR (The Swedish Research Council).
- ◇ Visiting Scholar, University of Michigan, Ann Arbor, USA. Supported by VR. 2006/10/1–2006/12/31
- ◇ Post-doc, Erwin Schrödinger Institute (ESI), Vienna, Austria. Supported by SVEFUM. 2005/10/1–2006/12/31
- ◇ PhD student, GU, (20% teaching). 2000/10/1–2005/9/30
- ◇ Part-time teaching assistant, GU. 1998/9/1–2000/9/30
- ◇ Welder of plastic parts in car engines, MANN+HUMMEL GMBH, Sonneberg, Germany 1995/10/1–1996/7/31

EDUCATION AND TRAINING

- ◇ Associate professor (oavlönad docent) in mathematics, GU. 2010
- ◇ Doctor of philosophy (filosofie doktor) in mathematics, GU. 2005
- ◇ Licentiate of philosophy (filosofie licentiat) in mathematics, GU. 2003

◇ Bachelor of science (filosofie kandidat) in mathematics, GU.

2000

HONORS AND GRANTS

- ◇ Wallenberg prize 2013.
- ◇ Ruth and Nils-Erik Stenbäck Foundation Stipend 2011: 25000 Euro for research in basic sciences (mathematics, physics, chemistry).
- ◇ GoCAS (Gothenburg Center for Advanced Studies) grant for organizing the conference NORDAN 2017, 96000 SEK (2016). Joint with R. Berman, D. Eriksson, D. Witt Nyström, and E. Wulcan.
- ◇ Four years research fundings (75% of full time) from VR (2011).
- ◇ A 5-month post-doc grant from Institut Mittag-Leffler (2008).
- ◇ A 2-year post-doc grant from the VR (2006–2008).
- ◇ A 3-month post-doc grant from SVEFUM (2005).

LIST OF PUBLICATIONS

Peer-reviewed papers

- xix [Explicit Serre duality on complex spaces](#). *Adv. Math.* 305 (2017), 1320–1355. Joint with Jean Ruppenthal and Elizabeth Wulcan.
- xviii [One parameter regularizations of products of residue currents](#). To appear in the memorial volume of Mikael Passare; proceedings of “Facets of Geometry, a tribute to the memory of Torsten Ekedahl and Mikael Passare”. Available at arXiv:1303.0106 [math.CV]. Joint with Mats Andersson, Elizabeth Wulcan, and Alain Yger.
- xvii [A Ronkin type function for coamoebas](#). *J. Geom. Anal.*, to appear. Available at arXiv:1412.1585 [math.CV, math.AG, math.CO]. Joint with Petter Johansson.
- xvi [Presence or absence of analytic structure in maximal ideal spaces](#). *Math. Ann.* 366 (2016), no. 1-2, 459–478. Joint with Alexander Izzo and Erlend F. Wold.
- xv [Segre numbers, a generalized King formula, and local intersections](#). *J. reine angew. Math. (Crelle’s journal)*, to appear. Available at arXiv:1009.2458 (version 2) [math.CV, math.AG]. Joint with Mats Andersson, Elizabeth Wulcan, and Alain Yger.
- xiv [Adjunction for the Grauert-Riemenschneider canonical sheaf and extension of \$L^2\$ -cohomology classes](#). *Indiana Univ. Math. J.* 64 (2015), no. 2, 533–558. Joint with Jean Ruppenthal and Elizabeth Wulcan.
- xiii [Various approaches to products of residue currents](#). *J. Funct. Anal.*, **264** (2013), 118–138. DOI10.1016/j.jfa.2012.10.004. Joint with Richard Lärkäng.
- xii [A Dolbeault-Grothendieck lemma on complex spaces via Koppelman formulas](#). *Invent. Math.* 190 (2012), No. 2, 261–297. DOI10.1007/s00222-012-0380-9. Joint with Mats Andersson.
- xi [Koppelman formulas on flag manifolds and harmonic forms](#). *Math. Z.*, 272 (2011), no. 3-4, 1087–1095. DOI10.1007/s00209-011-0976-6. Joint with Henrik Seppänen.
- x [Uniform algebras and approximation on manifolds](#). *Invent. Math.* 188 (2012), No. 3, 505–523. DOI10.1007/s00222-011-0351-6. Joint with Erlend Fornæss Wold.
- ix [Weighted Koppelman formulas and the \$\bar{\partial}\$ -equation on an analytic space](#). *J. Funct. Anal.*, **261** (2011), 777–802. Joint with Mats Andersson.
- viii [Regularizations of residue currents](#). *J. reine angew. Math.* **649** (2010), 33–54. Joint with Jan-Erik Björk.
- vii [On the Briançon-Skoda theorem on a singular variety](#). *Ann. Inst. Fourier*, **60(2)** (2010), 417–432. Joint with Mats Andersson and Jacob Szajdman.
- vi [Koppelman formulas on Grassmannians](#). *J. reine angew. Math.*, **640** (2010), 101–115. Joint with Elin Götmark and Henrik Seppänen.
- v [Analytic continuation of residue currents](#). *Ark. Mat.*, **47** (2009), 127–141.

- iv [Operators with smooth functional calculi](#). *J. Anal. Math.*, **98** (2006), 221–248. Joint with Mats Andersson and Sebastian Sandberg.
- iii [Multidimensional Cayley transforms and tuples of unbounded operators](#). *J. Operator Theory*, **56(2)** (2006), 317–342.
- ii [Regularizations of products of residue and principal value currents](#). *J. Funct. Anal.*, **239(2)** (2006), 566–593.
- i [A regularisation of the Coleff-Herrera residue current](#). *C. R. Acad. Sci. Paris, Ser. I* **339(4)** (2004), 245–250. Presented by Pierre Lelong.

Preprints

- xxiv [Holomorphic forms, the \$\bar{\partial}\$ -equation, and duality on a reduced complex space](#). Submitted. Available at arXiv:1506.07842 [math.CV, math.AG].
- xxiii [Nonproper intersection theory and positive currents II, global formulas](#). In preparation. Joint with Mats Andersson, Dennis Eriksson, Elizabeth Wolcan, and Alain Yger.
- xxii [Nonproper intersection theory and positive currents I, local aspects](#). Available at arXiv:1009.2458 (version 1) [math.CV, math.AG]. Joint with Mats Andersson, Elizabeth Wolcan, and Alain Yger.
- xxi [Koppelman formulas and the \$\bar{\partial}\$ -equation on an analytic space](#). Institut Mittag-Leffler preprint series, REPORT No. 40, 2007/2008, spring. Joint with Mats Andersson.
- xx [The residue current of a codimension three complete intersection](#). ESI preprint no. 1836, 2006.

Theses

- xxvi [On residue currents and multivariable operator calculus](#). ISBN 91-628-6586-2, doctoral thesis defended at the University of Gothenburg in September 2005.
- xxv [Multidimensional Cayley transforms and projective operators](#). ISSN 0347-2809/NO 2003:26, licentiate thesis presented at the University of Gothenburg in April 2003.

SCIENTIFIC QUALIFICATIONS

National and international collaborative projects

- ◇ Collaboration with Erlend F. Wold and Erik Løv (Oslo) on a project about polynomial convexity and uniform algebras.
- ◇ Collaboration with Jean Ruppenthal (Wuppertal) and Elizabeth Wulcan on a project about the $\bar{\partial}$ -equation on complex spaces and L^2 -extensions of cohomology classes.
- ◇ Collaboration with Mats Andersson, Dennis Eriksson, Elizabeth Wulcan (Göteborg), and Alain Yger (Bordeaux) on a project about a residue approach to non-proper intersection theory and applications.
- ◇ Collaboration with Henrik Seppänen (Göttingen) on a project about canonical integral formulas on symmetric spaces and applications to representation theory.

Supervision experience

- ◇ Advisor for Mattias Lennartsson, PhD student, since Autumn 2016.
- ◇ Advisor for Petter Johansson, PhD student, Stockholm University (Jan. 2012 – June 2014).
 - Ph.D. thesis: *On the topology of the coamoeba*. Defended on June 12, 2014.
- ◇ Co-advisor (together with Mats Andersson) for Jacob Sznajdman, PhD student, CTH, since Nov. 2007.
 - Ph.D. thesis: *An analytic approach to Briançon-Skoda type theorems*. Presented on May 25, 2012.
 - Licentiate thesis: *Some analytic generalizations of the Briançon-Skoda theorem*. Presented on March 18, 2010.
- ◇ Master's thesis advisor for Zakarias Sjöström Dyrefelt, GU. *Bergman kernels for high powers of positive line bundles*, presented on June 11, 2014.

Outside expert for positions

- ◇ University Lecturer in Mathematics at Högskolan i Gävle, Autumn 2016.

Ph.D. committee membership

- ◇ Ketil Tveiten, Stockholm University, Sept. 18, 2015. Thesis title: *Period integrals and other direct images of D -modules*, advisor: Rikard Bøgvad.

Referee work for journals

International Mathematics Research Notices; Mathematische Annalen; Proceedings of the American Mathematical Society; Journal of Geometric Analysis; Annali della Scuola Normale Superiore di Pisa – Classe di Scienze; Annales Polonici Mathematici; Journal of Mathematical

Analysis and Applications; Analysis, International Mathematical Journal of Analysis and its Applications;

Brief research profile

My area of research is several complex variables (SCV). Loosely speaking, SCV is the study of complex manifolds/spaces and holomorphic functions. It is a central field of mathematics with close connections with, e.g., the theory of partial differential equations, algebraic geometry, commutative algebra, representation theory and harmonic analysis. SCV also has connections with theoretical physics; Fock spaces appear naturally in quantization and moreover, complex geometry (e.g., Kähler-Einstein geometry) as well as the representation theory of Lie groups play fundamental roles in modern theoretical physics.

My research is focused on the calculus of residue currents and integral formulas. Residue currents are analytic objects (analogous to distributions) that describe algebraic and geometric objects. Together, residue currents and integral formulas provide powerful analytic tools for studying geometric, algebraic, and of course complex analytic problems. Recently I have also become interested in uniform algebras and uniform approximation by prescribed functions. The classical motivation comes from Weierstrass' theorem which says that the algebra of continuous functions, $C^0(I)$, on a compact interval $I \subset \mathbb{R} \subset \mathbb{C}$ equals the uniform algebra, $[z]_I$, generated by the complex variable z on I .

The overall goal of my research is 1) to develop new applications of integral formulas and the calculus of residue currents to complex and algebraic geometry, representation theory, and commutative algebra, and 2) to describe uniform algebras generated by natural classes of functions on compact sets in \mathbb{C}^n

TEACHING QUALIFICATIONS

Studies in educational theory

- ◇ *Teaching and learning in Higher Education 1: Basic Course* (HPE101) 5hec, GU, 2017.
- ◇ *Teaching and learning in Higher Education 2: Discipline Specific Pedagogic* (HPE102) 5hec, GU, 2016.
- ◇ *Supervision in Postgraduate Programmes* (HPE201) 5hec, GU, 2009.

Course development

During the fall of 2008 I developed and gave the PhD course *Complex analytic varieties*, 7.5hec. The course treats fundamental complex geometry, e.g., the Weierstrass preparation theorem, the local parametrization theorem, the basics of coherent sheaves, weak and strong holomorphicity, normality and Oka's normalization theorem, the basics of complex spaces and analytic schemes.

Teaching experience

- ◇ Full responsibility of, and lecturer on *Analytiska funktioner* (MMG700), 7.5hec, GU, Autumn 2015, 2016.
- ◇ Lecturer on *Matematik för tekniskt basår, del D* (LMA164), 4.5hec, CTH, Spring 2014.
- ◇ Full responsibility of, and lecturer on *Envariabelanalys, del 1* (MMG200), 7.5hec, GU, Autumn 2012, 2013, 2014.
- ◇ Full responsibility of, and lecturer on *Matematisk introduktionskurs, IT* (TMA235), 1.5hec, CTH, Autumn 2011.
- ◇ Full responsibility of, and lecturer on the theory part of *Analys och linjär algebra, del C* (TMV036), 6hec, for the three programs K, Kf, Bt, at CTH, Spring 2010. (About 180 students)
- ◇ Developer of, full responsibility of, and lecturer on the PhD course *Complex analytic varieties*, 7.5hec, at GU, Autumn 2008.
- ◇ Full responsibility of, and lecturer on the course *Analys fortsättning, för lärare*, 7.5hec, at the GU on three occasions, 2003, 2004 and 2005.
- ◇ Full responsibility of, and lecturer on the summer course *Elementary Number Theory* 7.5hec, at GU, 2003, together with Fredrik Engström.
- ◇ Teaching assistant (2011–)
 - *System och transformer för D, E och I* (FMAF05), 7.5hec, Spring 2012, LTH, Lund University.
 - *Funktionsteori för D, E och I* (FMAF01), 7.5hec, Spring 2012, LTH, Lund University.

- *Matematisk analys i en variabel, TD (TMV181)*, 7.5hec, Autumn 2011, CTH.
 - *Inledande matematik, V och AT (TMV125)* 7.5hec, Autumn 2011, CTH.
 - *Inledande matematik, TD (TMV176)*, 7.5hec, Autumn 2011, CTH.
- ◇ During my PhD time (2000-2005) I was teaching 20 % of full time. I was mainly teaching assistant on basic analysis courses but also on more advanced courses such as analysis in several variables and Fourier analysis on several occasions.

Specification:

- *Inledande kurs, funktionslära*, 7.5hec, GU, 2004.
 - *Fourieranalys* 7.5hec, GU, 2003, 2002, 2001.
 - *Matematisk analys i en variabel V, del B*, CTH, 2002.
 - *Transformer E2*, CTH, 2001.
 - *Flervariabelanalys del 2*, 7.5hec, GU, 2001.
 - *Algebra, analys och sannolikhetslära på NP*, GU, 2000.
- ◇ Part-time teaching assistant at GU and CTH, 1998–1999.

Specification:

- *Envariabelanalys för lärare*, GU, 1999.
- *Inledande kurs, funktionslära och tillämpningar*, GU, 1998.

ADMINISTRATIVE EXPERIENCE

- ◇ I am *vice head* of the Division of Algebra and Geometry, Mathematical Sciences, GU & CTH, since September 1, 2016.
- ◇ I was *head of the unit* “Algebraic geometry and complex analysis” at the Division of Mathematics, Mathematical Sciences, GU & CTH , Spring 2015 – June 31 2016.
- ◇ I was a *member of the steering group* for the Division of Mathematics, Mathematical Sciences, GU & CTH , August 2014 – June 2016.
- ◇ Training in *salary setting dialogues (lönesättande samtal)*
 - GU, half a day, September 2015
 - CTH, one day, November 2015
- ◇ “*Arbeta i ledningsgrupp*”, half a day course on how to work in a steering group, GU, Nov. 2015.
- ◇ One day training, *performance review (utvecklingssamtal)*, GU, Nov. 2, 2015.
- ◇ I was the organizer of the Special Complex Analysis Seminar (KASS) at CTH & GU between 2008 and 2010.

SELECTED TALKS

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- ◇ *A Ronkin type function for coamoebas*. Complex analysis seminar, University of Wuppertal, December 2015.
 - ◇ *Holomorphic forms and the $\bar{\partial}$ -equation on reduced complex spaces*. Complex analysis seminar, University of Wuppertal, Germany, November 2015.
 - ◇ *Differential forms on analytic varieties I & II*. The complex analysis seminar (KASS), GU and CTH, November & December 2015.
 - ◇ *Explicit Serre duality on singular spaces*. Summer School and Workshop: Differential Forms on Singular Complex Spaces. Hausdorff Center for Mathematics, Bonn, Germany, July 2014.
 - ◇ *Något om likformiga algebror*. Svenska matematikersamfundets höstmöte 2013, Uppsala, November 2013.
 - ◇ *Regularizing residue currents*. Facets of geometry, a tribute to the memory of Torsten Ekedahl and Mikael Passare, Stockholm University, June 2013.
 - ◇ *Integral formulas and the $\bar{\partial}$ -equation on singular spaces*. NORDAN 2012, Kiruna, Sweden, May 2012.
 - ◇ *Uniform algebras and approximation on manifolds*. Workshop (Geometric Methods of Complex Analysis) at the Oberwolfach research institute, Germany, April 2011.
 - ◇ *Analytic tools in geometry and algebra*. Docent lecture, GU and CTH, June 2010.
 - ◇ *A fine resolution of the structure sheaf of a complex space*. Workshop (Komplexe Analysis und Geometrie), University of Leipzig, Germany, December 2009.
 - ◇ *Koppelman formulas and the $\bar{\partial}$ -equation on analytic spaces*. Complex Analysis Seminar, Universität Wien, Austria, November 2008.
 - ◇ *Regularizations of residue currents*. The Pluri-Complex seminar at Stockholm University, Stockholm, Sweden, October 2008.
 - ◇ *Classical residue theory*. Universitetet i Oslo, Norway, September 2008.
 - ◇ *Koppelman formulas and the $\bar{\partial}$ -equation on analytic varieties*. Institut Mittag-Leffler, Djursholm, Sweden, February 2008.
 - ◇ *Koppelman formulas on Grassmannians*. Ausgewählte Kapitel der Komplexen Analysis, University of Wuppertal, Germany, October 2007.
 - ◇ *Residue currents and weighted integral formulas*. SCV-seminar, University of Michigan, Ann Arbor, USA, October 2006.
 - ◇ *Various approaches to the residue of a complete intersection*. Degenerate Structures in Complex Analysis, conference in Bergisch Gladbach, Germany, May 2006.

- ◇ *Various approaches to the residue of a complete intersection.* NORDAN 2006, Sundsvall, Sweden, May 2006.
- ◇ *Ehrenpreis' fundamental principle and residue currents.* KAUS 2006, Göteborg, Sweden.
- ◇ *Regularizations of residue currents.* Complex Analysis and PDE's, workshop at the Erwin Schrödinger Institute, Vienna, Austria, November 2005.
- ◇ *A generalization of the Cayley transform to tuples of operators.* The PLUS seminar, Sundsvall, Sweden, 2005.
- ◇ *A regularisation of the Coleff-Herrera residue current.* University of Bordeaux 1, Bordeaux, France, 2004.