

Dr. Thomas Herbst

Research Group Leader

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Profile

More than 35 years of experience in the design, construction, commissioning, and scientific exploitation of innovative astronomical instrumentation. Science focus on high angular resolution astronomy and star formation. Wide knowledge of observatory planning and operations. Team leadership, student / postdoctoral supervision, and public service.

Education

- 1987 – 1990** **Ph.D. in Astronomy, Cornell University, Ithaca, New York**
Thesis Title: *“New Views in the Near Infrared: A Fabry-Perot Interferometer for Galactic and Extragalactic Astronomy”*
Thesis Advisor: Steve Beckwith
- 1983 – 1986** **M.S. in Astronomy, Cornell University, Ithaca, New York**
Advisor: Steve Beckwith
- 1978 – 1983** **B.Sc. in Honours Physics, University of Waterloo, Waterloo, Ontario**
(5-year work/study co-op program)
Thesis Title: *“Digital Image Enhancement of the Optical Warp in M31”*

Professional Appointments

- 2000 – present** **Research Group Leader (C3)**
Max Planck Institute for Astronomy, Heidelberg, Germany
- 1996 – 1999** **Tenured Research Associate**
Max Planck Institute for Astronomy, Heidelberg, Germany
- 1992 – 1996** **Postdoctoral Associate**
Max Planck Institute for Astronomy, Heidelberg, Germany
- 1990 – 1992** **Assistant Astronomer**
NASA Infrared Telescope Facility, University of Hawaii, Honolulu, HI
- 1984 – 1989** **Graduate Research Assistant**
Cornell University, Ithaca, NY
- 1983 – 1984** **Teaching Assistant**
Cornell University, Ithaca, NY

Instrumentation Experience

2019 – present Telescope System Lead

SDSS-V Local Volume Mapper (LVM)

LVM is an ambitious project to map the entire Galactic disk, the Magellanic Clouds, and several nearby galaxies in UV to NIR spectral lines with the goal of understanding the interaction of star formation with the interstellar medium.

More information at: www.sdss.org/future/lvm/

2002 – present Principal Investigator

LINC-NIRVANA Multi-Conjugate Adaptive Optics System

LINC-NIRVANA is an innovative Multi-Conjugate Adaptive Optics (MCAO) system for both eyes of the Large Binocular Telescope. It uses natural guide stars and a number of novel techniques to deliver near diffraction-limited imagery. More

information at: www.mpia.de/LINC/

1994 – 1999 Co-Principal Investigator

MAX Thermal Infrared Camera

MAX was a mid-infrared (4-27 μm) imager based on a Rockwell 128x128 Si:As BIB detector. Hosted at the UKIRT telescope on Mauna Kea, MAX supported a broad array of science, ranging from asteroids to extragalactic astronomy. Now

decommissioned. More information at: www.mpia.de/IRCAM/MAX/MAX.html

1992 – 1995 Co-Principal Investigator

MAGIC Near-Infrared Cameras

The two MAGIC cameras were near-infrared imagers and spectrographs based on Rockwell 256x256 NICMOS3 detectors. For more than 20 years, they were the facility NIR instruments at the Calar Alto Observatory in southern Spain. Now

decommissioned. More information at: www.caha.es/CAHA/instruments/IRCAM/MAGIC/index.html

1985 – 1992 Principal Investigator

Cornell Near-Infrared Fabry Perot Interferometer

This instrument was a graduate student project to build a high-resolution Fabry-Perot interferometer to use as a pre-filter for near-infrared (1-5 μm) imagers and spectrographs. It was used mostly at IRTF on Mauna Kea and the Palomar 5m.

Now decommissioned.

Publications

Author of ca. 85 refereed papers (16 as first author) and almost 200 conference proceedings. A complete up-to-date list appears at:

[https://ui.adsabs.harvard.edu/search/filter_database fq_database=OR&filter_database fq_database=database%3A%22astronomy%22&format=SHORT&fq=%7B!type%3Dagp%20v%3D%24fq_database%7D&fq_database=\(database%3A%22astronomy%22\)&q=author%3A\(%22Herbst%2C%20T.%22\)&so](https://ui.adsabs.harvard.edu/search/filter_database fq_database=OR&filter_database fq_database=database%3A%22astronomy%22&format=SHORT&fq=%7B!type%3Dagp%20v%3D%24fq_database%7D&fq_database=(database%3A%22astronomy%22)&q=author%3A(%22Herbst%2C%20T.%22)&so)

Books Edited

“Instrumentation for Extremely Large Telescopes,” proceedings of a conference held at Ringberg Castle, 25-29 July 2005

“Science with the Large Binocular Telescope,” proceedings of a workshop held at Ringberg Castle, 24-29 July 2000

Research Supervision

Primary advisor of 12 postdoctoral scholars, 6 PhD students, and 2 Master’s students. Additional supervision of multiple Bachelor, undergrad, and high school projects.

Postdoctoral Scholars

Fabio Santos	Currently a postdoc at MPIA Heidelberg
Kalyan Radhakrishnan	Currently a postdoc at Osservatorio Astronomico di Padova, Padova
Rosalie McGurk	Currently a Postdoctoral Fellow at the Carnegie Observatories, Pasadena
Jörg-Uwe Pott	Currently a tenured staff researcher at MPIA
Josh Schlieder	Currently a Research Astrophysicist at NASA Goddard Space Flight Center, Greenbelt, MD
Derek Kopon	Currently an Instrument Scientist at Smithsonian Astrophysical Observatory, Cambridge, MA
Xianyu Zhang	Currently an Adaptive Optics Scientist at the Large Binocular Telescope, Tucson, AZ
Matthieu Brangier	Currently a physics teacher for the French Ministry of Education
Maken Gustafsson	Currently a Lead Senior Specialist at MHI Vestas Offshore Wind, a Danish firm which produces offshore wind turbines for electricity generation
David Andersen	Currently an Astronomer and Instrument Scientist at the Herzberg Institute of Astrophysics, Victoria, Canada
Lucas Labadie	Currently a Professor at the University of Cologne, Germany
Marc Ollivier	Currently an Astronomer at the Institut d’Astrophysique Spatiale, Orsay, France

PhD Students

Kalyan Radhakrishnan	Currently a postdoc at Osservatorio Astronomico di Padova, Padova
Xianyu Zhang	Currently an Adaptive Optics Scientist at the Large Binocular Telescope, Tucson, AZ
Roman Follert	Currently a Scientist at the Thüringer Landessternwarte, Tautenburg
Yan Zhaojun	Currently an Optical Information Processing Engineer at Shanghai Astronomical Observatory, Shanghai
Sebastian Egner	Currently an Instrumentation Physicist at ESO Garching
Angela Hempel	Currently a Postdoctoral Fellow at Universidad Andrés Bello in Santiago, Chile

Master's, Bachelor, and Other Students

Johannes Schmidt (Master's), Stefan Hanke (Master's), Moritz Plenz (Bachelor), Patrick Fopp (Bachelor), David Neb (Bachelor), Duan Li (undergrad), Jakob Staudt (Hector Seminar), Julia Schwarzbeck (high school), Henri Schmidt (high school)

Selected Invited Talks

Approximately 20 public presentations per year, including colloquia, conferences, public talks, consortium meetings, etc. The following list is a subset of invited talks and lectures.

"Review of Calar Alto imaging, photometry, and spectroscopy of the SL-9 impacts,"
Invited review at the IAU XXII General Assembly, den Haag, August 1994

"Imaging and Spectroscopy with Future Visible and NIR Telescopes,"
Invited talk at the 4th Köln-Bonn-Zermatt Symposium, Zermatt, September 2003

"Darwin and the Search for Life Beyond the Solar System,"
Invited Plenary at the UK National Astronomy Meeting, Milton Keynes, March 2004

"High Resolution Mapping of Exo-Zodi Disks with JWST and ALMA
Invited talk at the 2nd TPF/Darwin International Conference, San Diego, July 2004

"Working Beyond the Fringe: Achieving 10 mas True Imagery with the Large Binocular Telescope,"
Invited talk at the DFG / NSF Colloquium, Washington, June 2007

"Infrared Astrophysics and Reaching the Natural Limits to Observing,"
Invited series of 4 lectures at the Santander Summer School, Santiago, Nov. 2014

The LINC-NIRVANA Multi-Conjugate Adaptive Optics System: On Its Way to Sky!
Invited talk at the Optical Society of America Conference, Heidelberg, July 2016

Public Service

The following items represent a subset of public service activities.

ELT Project Science Team	The PST is the working group for the European ELT science case. Member since July 2012
NOVA Instrument Steering Committee	Oversight committee for the Dutch national instrumentation program. Member since April 2013
ESO Science and Technical Committee	Primary oversight committee for planning and operation of the European Southern Observatory. Member from 2006-2011
ESO ELT Science and Engineering Committee	Oversight panel for the European ELT. Member 2006-2011. Chair from 2008-2011
LBT Science and Technical Committee	Primary oversight committee for planning and operation of the Large Binocular Telescope. Member from 1997-2014. Chair from 2000-2004
Darwin TE-SAT	ESA Darwin Terrestrial Exoplanet Science Advisory Team. Supporting the European Space Agency's Darwin interferometer mission. Member from 1997-2007
MPIA PhD Advisory Committee	The PAC meets yearly with each MPIA PhD student, providing external monitoring, feedback, and mediation if necessary. Member for ca. 20 years
MPIA Computer Committee	The CC is the primary interface between users and the IT department, with oversight responsibilities on planning and resource allocation. Member and chair since 2015

Languages and Skills

Languages	English (mother tongue) French (spoken and written) German (spoken)
Computer	Python, C, HTML, Fortran, Pascal, BASIC, assembler programming Unix, MacOS, Windows, DOS, VMS operating systems Qt4, Qt5, Qt Designer for Graphical User Interfaces
Data Reduction	Python, IRAF, TOPCAT, IDL, GIPSY
Design and Publication	Zemax (optical design), Blender (3D), Adobe Photoshop, Illustrator, InDesign, Premier, Dreamweaver