

CURRICULUM VITAE

Achim Weiss

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Contact data

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Education and Career Steps

1963-1967 elementary school: Hallschule Augsburg
1967-1976 high school : Holbein-Gymnasium Augsburg
graduating with German "Abitur" (grade 1.5)

7/1976-9/1977 compulsory military service

11/1977-2/1983 physics studies at Ludwigs-Maximilians-Universität München
Diploma in physics

1983-1986 PhD thesis at MPI f. Astrophysik, Garching
(PhD fellowship of the Max-Planck-Society)
supervisor R. Kippenhahn

1/1987 PhD (Dr. rer.nat) in physics (grade "magna cum laude")
Thesis subject: "Entwicklungszustand und Pulsationseigenschaften von
R Cor Bor Sternen" (Evolution and pulsations of R Cor Bor stars)

1985-1987 post-doc (research associate) at MPI f. Astrophysik
1987-1989 post-doc at University of Illinois, Champaign-Urbana (USA) with James W. Truran
1989-1993 research associate at MPI f. Astrophysik
since 1993 scientific staff member at MPI f. Astrophysik

7/2000 Habilitation in astronomy at Ludwigs-Maximilians-Universität München
1/2001 granted the "venia legendi" and appointed "Privatdozent" by the
Ludwig-Maximilians-Universität Munich

7/2014 appointed "Honorarprofessor" at Ludwig-Maximilians-Universität Munich

Research activities

My research field is the structure and evolution of single stars of all masses, chemical composition and evolutionary state. Part of the activities concern the continuous development and improvement of our stellar evolution code GARSTEC (Weiss & Schlattl 2008), which I claim to be one of the technically most advanced, stable and reliable codes, which are available. Although the code is able to follow stars of all masses, I am most interested in low- and intermediate mass stars, and in particular in old populations. Therefore, projects over the past years concerned

1. the Sun: structure; use as a stellar laboratory
2. globular clusters: ages, abundance anomalies
3. low-mass stars: seismology, envelope structure, ages of red giants
4. First stars: evolution and nucleosynthesis in metal-free to extremely metal-poor low-mass stars; carbon/nitrogen anomalies
5. Pop. II field stars: ages, Li abundance, final stages
6. AGB-stars: structure, evolution, nucleosynthesis, final stages; Planetary Nebulae Luminosity Function

7. non-local convection: parameter determination; new convection theories, ...
8. fundamental stellar parameters from seismology, detached eclipsing binaries, ...

Professional activities

Memberships

Astronomische Gesellschaft (1983-2011)
International Astronomical Union (since 1991)

Long-term research visits

3-4/1990 Istituto di Astrofisica Spaziale, Frascati, Italy
5-6/1999 Osservatorio Teramo, Italy
10-12/2000 Inst. f. Advanced Study, Princeton, USA
3-4/2002 Inst. f. Nuclear Theory, Seattle, USA
9-12/2006 Dartmouth College, Hanover, USA
9-12/2009 University of Canterbury, Christchurch, New Zealand

Panel work (since 2010)

2010-2012 Workpackage leader of the PLATO PSPM science team
2011-2014 Elected member of the Section for Chemistry, Physics and Technology of the Scientific Council of the Max-Planck-Gesellschaft
2014- Co-chair of WG8 (Red Giants) of the *KEPLER* Astroseismology Consortium
2016- CoCo representative of MPA in SDSS IV
2017 Contributor to "Denkschrift 2017" (Abschnitt 4.1) of the German astronomical community

Referee

for all major astronomical journals
for German science and funding organisations (DFG, DAAD, AvH, MPG, Fulbright)
for various international research funding agencies (Italy, Belgium, Netherlands, Australia, France, Canada), since 2002

Organization of conferences (SOC, LOC) (since 2010)

5/2010 "Chemical enrichment of the Milky Way Galaxy", Tegernsee, Germany
7/2012 "Stellar Populations" (EWASS 2012), Rome, Italy
11/2012 "Reading the book of Globular Clusters through the lens of stellar evolution", Rome, Italy
7/2013 "Steps towards a new generation of stellar models", Leiden, The Netherlands
7/2014 "Helios and Helium: what is wrong with them?", EWASS2014/SP2, Geneva, Suisse
10/2014 "Resolved and unresolved stellar populations", ESO, Garching, Germany
5/2015 "The new Milky Way", MIAPP, Garching, Germany
11/2018 "Weighing stars from birth to death – How to determine stellar masses?" Leiden, The Netherlands
3/2019 "XIXth workshop on Nuclear Astrophysics", Ringberg Castle, Germany

Grants, Awards, and Honours (selected)

2006 Harris German-Dartmouth Distinguished Visiting Professorship
2009 Erskine Visiting Professorship (Univ. of Canterbury)
1999-2000 DAAD/Vigoni travel grant with Osservatorio Teramo "Evolution of Pop. III stars"
2002-2003 DAAD/Vigoni travel grant with Univ. Padova "Synthetic populations and late phases of low- and intermediate mass stars"
2006-2018 Member of "Excellence Cluster Universe" of DFG at Technical University Munich
2019- Member of "Excellence Cluster Origins" of DFG at LMU Munich/TU Munich

Fellowships (co-proposer) (summary)

I have, together with the fellowship holders, successfully applied for fellowships for 5 AvH-fellowships, 4 EARA grants, 1 TMR-fellowship

Teaching and student supervision (summary)

I have been teaching continuously since 1990 at the University of Munich, the International Max-Planck Research School on Astrophysics, the University of Augsburg, and sporadically as an invited lecturer at other universities in Germany and abroad.

Subjects have been: Introduction to Astrophysics, Stellar Evolution, Nucleosynthesis, Gravitational Lenses, Big Bang Nucleosynthesis, and others.

Since 2014 all lectures at LMU Munich have been given in English.

Teaching since 2010

2009/2010	"Theorie des Sternaufbaus" (Lecture: Univ. Konstanz)
2009/2010	"Sternaufbau und Sternentwicklung II" (Lecture: Univ. München)
2010	"Sternentwicklung - Theorie und Anwendung" (Lecture: Univ. München)
2011	"Sternaufbau und Sternentwicklung II" (Lecture: Univ. München)
2011	"Stellar Structure and Evolution Theory" (Lecture: IMPRS Astrophysics, Munich)
2012	"Nucleosynthesis" (Lecture: Univ. München)
2013	"Sternaufbau und Sternentwicklung II" (Lecture: Univ. München)
2014	"Stellar Structure and Evolution Theory" (Lecture: IMPRS Astrophysics, Munich)
2014	"Sterne – Theorie und Anwendung" (Lecture: Univ. München)
2015	"Sternaufbau und Sternentwicklung I" (Lecture: Univ. München)
2015/16	"Sternaufbau und Sternentwicklung II" (Lecture: Univ. München)
2016	"Nucleosynthesis" (Lecture: Univ. München)
2016/17	"Sternaufbau und Sternentwicklung I" (Lecture: Univ. München)
2017	"Sternaufbau und Sternentwicklung II" (Lecture: Univ. München)
2018	"Stellar Structure and Evolution Theory" (Lecture: IMPRS Astrophysics, Munich)
2018	"Nucleosynthesis" (Lecture: Univ. München)
2018/2019	"Sternaufbau und Sternentwicklung I" (Lecture: Univ. München)
2020	"Stars: Theory and Applications" (Lecture: Univ. Munich)
2021	"Stellar Structure and Evolution Theory" (Lecture: IMPRS Astrophysics, Munich)
2021	"Nucleosynthesis" (Lecture: Univ. Munich)
2021/2022	"Introduction to the evolution of binary and multiple star systems" (Lecture:LMU)
2022	"Stellar Structure and Evolution I" (Lecture: Univ. Munich)
2022/2023	"Stellar Structure and Evolution II" (Lecture: Univ. Munich)

Student supervision (summary)

I have supervised >15 diploma/master students (physics and astronomy) as well as about 20 PhD students alone or as a co-supervisor. These numbers do not include purely formal supervisions.

For all of the listed PhD students I have been (ex officio) member of their PhD examination committee.

In addition, I served on an additional at least 20 PhD examination committees at the Munich University, and further 15 (or more) at external universities (Padova, Liverpool., Aarhus, Melbourne, Geneva, ...).

since 2010:

2006-2010	P. Jofre-Pfeil: "Age determinations of halo stars in SDSS/SDSS-2" (PhD IMPRS on Astrophysics; LMU Munich)
2007-2012	M. Alvez-Cruz: "s-process in Pop. III stars" (PhD IMPRS on Astrophysics; LMU Munich)
2008-2011	V. Silva: "Seismology of convection in KEPLER-stars" (PhD IMPRS on Astrophysics; LMU Munich)
2010	Z. Magic: "Effect of new solar abundances" (Diploma LMU Munich)
2010-2013	Z. Magic: "3d-envelope models for cool stars" (PhD IMPRS on Astrophysics); LMU Munich
2011-2021	N. Heners: "Uncertainties in stellar evolution calculations due to the treatment of convection" (Diploma LMU Munich)
2014-2018	G. Wagstaff: "Improved atmospheres for AGB stars"

	(PhD IMPRS on Astrophysics; LMU Munich)
2014-2015	J. Higl: “Calibration objects for stellar evolution theory” (Diploma LMU Munich)
2015-2018	F. Surot: “Star formation history of the MW bulge from VVV survey” (PhD IMPRS on Astrophysics; LMU Munich)
2016	M. Fleischmann: “The solar abundance problem” (Bachelor LMU Munich)
2016-2019	J. Higl: “3d-hydro simulation of core convection in low-mass stars” (PhD IMPRS on Astrophysics; LMU Munich)
2016-2019	A. Joergensen: “Astero-seismology of external, convective layers in stellar models” (PhD IMPRS on Astrophysics; LMU Munich)
2017	H. Bauch: “Numerische Behandlung verschiedener Zeitskalen von Brennen und Mischen in konvektiven Kernen massearmer Sterne” (Bachelor, Univ. Augsburg)
2017-	M. Aoki: “Li abundances in stellar clusters” (PhD IMPRS on Astrophysics; LMU Munich)
2018	M. Heinlein: “Semiconvection in Stars” (Bachelor TUM Munich)
2018-2022	L. Imasheva: “Nucleosynthesis in massive stars before and during the explosion as a CCSN” (PhD IMPRS on Astrophysics; LMU Munich; co-supervision with H.-Th. Janka)
2018-2022	F. Ahlborn: “Reynold-stress models for non-local convection in stellar models” (PhD IMPRS on Astrophysics; LMU Munich)
2020-	B. Remple: “s-process nucleosynthesis in AGB stars” (PhD IMPRS on Astrophysics; LMU Munich)
2021-2022	M. Metz: “A detailed study of mass accretion in binary systems and its effects on population synthesis” (Master TUM Munich; co-supervision with P. Neunteufel)
2021-2022	N. Deiser: “A search for a link between mergers and circumstellar matter around massive magnetic stars” (Master LMU Munich; co-supervision with D. Baade)
2022	S. Magel: “Kissing Instability in very low-mass stars: physical and numerical uncertainties” (Bachelor TUM Munich; co-supervision with H.-Th. Janka)
2022-	T. Braun: “Reynold-stress convection theory applied to stellar envelopes” (PhD IMPRS on Astrophysics; LMU Munich)

Invited talks at conferences and seminars (since 2010)

September 2010	Univ. Aarhus
October 2010	Liverpool John Moores University
November 2010	Red giants as probes of the structure and evolution of the Milky Way (Rome, Italy)
September 2011	20 th Stellar Pulsations Conference (Granada, Spain)
May 2012	MP for Chemistry, Mainz
July 2012	Ageing low-mass stars: from Red Giants to White Dwarfs (Liege, Belgium)
September 2013	World of Clusters (Padova, Italy)
March 2014	SYSE, annual meeting of the Deutsche Physikalische Gesellschaft (Berlin)
July 2014	GaiaCal2014, workshop on Ringberg Castle (Tegernsee, Germany)
March 2015	Russbach School on Nuclear Astrophysics (Russbach, Austria)
April 2018	Stars, Planets, Galaxies (Berlin, Germany)
July 2018	The Metal-Poor Galaxy (Ringberg Castle, Germany)
April 2019	SPP Stellar Physics Meeting (Heidelberg, Germany)
November 2019	Astronomical Colloquium (Freiburg, Germany)
September 2020	Faszination Astronomy (public talk, Heidelberg, Germany)
January 2022	Origin of the elements (public talk, Goettingen, Germany)

Publications – overview

Summary:

- > 160 publications in refereed journals
- > 110 other publications
- 2 textbooks, 1 popular book

Citations:

- total number of citations: > 11000 (ADS)
- normalized by the number of authors the rate is above 3200
- average citation is about 65
- h-index 59

Textbooks:

- Weiss, Hillebrandt, Ritter, Thomas
“Cox and Giuli's Principles of Stellar Structure”
(second, extended edition)
Cambridge Scientific Publishers (Cambridge) 2004
- Kippenhahn, Weigert, Weiss
“Stellar Structure and Evolution” (second edition)
Springer (Heidelberg) 2012

Refereed publications (since 2018)

- [1] Abdurro'uf, A. et al.:
The Seventeenth Data Release of the Sloan Digital Sky Surveys: Complete
Release of MaNGA, MaStar, and APOGEE-2 Data
ApJS 259(2), 35 (2022)
- [2] Aguirre Børsen-Koch, V. et al:
The BAYesian STellar algorithm (BASTA): a fitting tool for stellar stud-
ies, asteroseismology, exoplanets, and Galactic archaeology
MNRAS 509(3), 4344–4364 (2022)
- [3] Ahlborn, F., Kupka, F., Weiss, A., Flaskamp, M.:
Stellar evolution models with overshooting based on 3-equation non-local
theories. II. Main-sequence models of A- and B-type stars
A&A 667, A97 (2022)
- [4] Kupka, F., Ahlborn, F., Weiss, A.:
Stellar evolution models with overshooting based on 3-equation non-local
theories. I. Physical basis and the computation of the dissipation rate
A&A 667, A96 (2022)
- [5] Aoki, M., Primas, F., Pasquini, L., Weiss, A., Salaris, M., Carollo, D.:
Lithium in NGC 2243 and NGC 104
A&A 653, A13 (2021)
- [6] Higl, J., Müller, E., Weiss, A.:
Calibrating core overshooting parameters with two-dimensional hydrody-
namical simulations
A&A 646, A133 (2021)
- [7] Jørgensen, A.C.S., Montalbán, J., Angelou, G.C., Miglio, A., Weiss, A.,
Scuflaire, R., Noels, A., Mosumgaard, J.R., Silva Aguirre, V.:
On the impact of the structural surface effect on global stellar properties
and asteroseismic analyses
MNRAS 500(4), 4277–4295 (2021)
- [8] Remple, B.A., Angelou, G.C., Weiss, A.:
Determining fundamental parameters of detached double-lined eclipsing
binary systems via a statistically robust machine learning method
MNRAS 507(2), 1795–1813 (2021)
- [9] Serenelli, A., Weiss, A., Aerts, C, et al.:
Weighing stars from birth to death: mass determination methods across
the HRD
Astron. Astrophys. Rev.29(1), 4 (2021)

- [10] Sestl, E., Kudritzki, R.P., Weller, J., Urbaneja, M.A., Weiss, A.:
Modified Gravity and the Flux-weighted Gravity-Luminosity Relationship
of Blue Supergiant Stars
ApJ 914(2), 94 (2021)
- [11] Aguirre, V., et al.:
Detection and Characterization of Oscillating Red Giants: First Results
from the TESS Satellite
ApJL 889(2), L34 (2020)
- [12] Angelou, G.C., et al.:
Convective boundary mixing in low- and intermediate-mass stars - I. Core
properties from pressure-mode asteroseismology
MNRAS 493(4), 4987–5004 (2020)
- [13] Borre, C.C., et al.:
Short-term variability and mass loss in Be stars. V. Space photometry
and ground-based spectroscopy of γ Cas
A&A 635, A140 (2020)
- [14] Chaplin, W.J., et al.:
Age dating of an early Milky Way merger via asteroseismology of the
naked-eye star ν Indi
Nature Astronomy p. 7 (2020)
- [15] Christensen-Dalsgaard, J., et al.:
The Aarhus red giants challenge. II. Stellar oscillations in the red giant
branch phase
A&A 635, A165 (2020)
- [16] Mosumgaard, J.R., Sølvsten Jørgensen, A.C., Weiss, et al.:
Coupling 1D stellar evolution with 3D-hydrodynamical simulations on-
the-fly II: Stellar Evolution and Asteroseismic Applications
MNRAS 491, 1160–1173 (2020)
- [17] Silva Aguirre, V., et al.:
The Aarhus red giants challenge. I. Stellar structures in the red giant
branch phase
A&A 635, A164 (2020)
- [18] Wagstaff, G., Miller Bertolami, M.M., Weiss, A.:
Impact of convective boundary mixing on the TP-AGB
MNRAS 493(4), 4748–4762 (2020)
- [19] Jørgensen, A.C.S., Weiss, A., Angelou, G., Silva Aguirre, V.:
Mending the structural surface effect of 1D stellar structure models with
non-solar metallicities based on interpolated 3D envelopes
MNRAS 484, 5551–5567 (2019)
- [20] Jørgensen, A.C.S., Weiss, A.:
Overcoming the structural surface effect with a realistic treatment of tur-
bulent convection in 1D stellar models
MNRAS 488, 3463–3473 (2019)
- [21] Pasquini, L., et al.:
Masses of the Hyades white dwarfs. A gravitational redshift measurement
A&A 627, L8 (2019)
- [22] Surot, F., et al.:
Mapping the stellar age of the Milky Way bulge with the VVV. I. The
method
A&A 623, A168 (2019)
- [23] Higl, J., Siess, L., Weiss, A., Ritter, H.:

An analysis of the TZ Fornacis binary system
A&A 617, A36 (2018)

[24] Jørgensen, A.C.S., Mosumgaard, J.R., Weiss, A., Silva Aguirre, V., Christensen-Dalsgaard, J.:
Coupling 1D stellar evolution with 3D-hydrodynamical simulations on the fly - I. A new standard solar model
MNRAS 481, L35–L39 (2018)

[25] Jørgensen, A.C.S., Weiss, A.:
Addressing the acoustic tachocline anomaly and the lithium depletion problem at the same time
MNRAS 481, 4389–4396 (2018)

[26] Mosumgaard, J.R., Ball, W.H., Silva Aguirre, V., Weiss, A., Christensen-Dalsgaard, J.:
Stellar models with calibrated convection and temperature stratification from 3D hydrodynamics simulations
MNRAS 478, 5663–5672 (2018)

[27] Wagstaff, G., Weiss, A.:
Influence of the outer boundary condition on models of AGB stars
MNRAS 477, 4824–4837 (2018)