

Martha L. Boyer

CONTACT INFORMATION

Space Telescope Science Institute (STScI)

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RESEARCH INTERESTS

My research revolves around dust production in evolved stars in low metallicity environments. I have used infrared observatories to study the circumstellar dust of Asymptotic Giant Branch (AGB) stars and more massive red supergiants in environments ranging from metal-poor globular clusters to more metal-rich Local Group dwarf galaxies.

EDUCATION

The University of Minnesota, Minneapolis, MN USA

Ph.D., Astrophysics Dec. 2008

- Thesis Topic: *Mass Loss in Metal-Poor AGB Stars*
- Advisors: Drs. Evan Skillman, Charles Woodward & Robert Gehrz

M.S., Astrophysics June 2006

- Thesis Topic: *Dust in the Intracluster Medium of M15*

B.S., Physics and B.S., Astrophysics Dec. 2003

- Final Project: *Infrared Photometry with the Spitzer Space Telescope*

RESEARCH APPOINTMENTS

Postdoctoral Researcher, STScI 2009-present

- *Surveying the Agents of Galaxy Evolution in the SMC*
- Supervisor: Dr. Karl Gordon

Technical Aide, 3M 2003-2004

- *Multilayer Optical Thin Film Interference Filters*
- Supervisor: Dr. Mike Weber

Research Assistant, Arecibo Observatory 2002

- *A Multi-Frequency Study of the Pulsar Emission Region*
- Supervisor: Dr. Yashwant Gupta

Research Assistant, University of Georgia 2000

- *A Search for Variable Stars in Open Clusters*
- Supervisor: Dr. J. Scott Shaw

TEACHING/OUTREACH EXPERIENCE

Loyola University Maryland , Baltimore, MD USA	
Adjunct Faculty: Introductory Astronomy Lecture	2010-present
Towson University , Towson, MD USA	
Adjunct Faculty: Introductory Astronomy Laboratory	2011
Outreach: <i>Baltimore Project Astro</i>	2009-present
University of Minnesota , Minneapolis, MN USA	
Lecturer: Introductory Astronomy	2008
Outreach: Astronomy Department Outreach Director	2006-2008
Course Work: Preparing Future Faculty	2006
Outreach: <i>Universe in the Park</i>	2005-2008
Teaching Assistant: Introductory Astronomy	2006
Teaching Assistant: Introductory Physics for Biology Majors	2004

AWARDED GRANTS/PROPOSALS

Boyer, et al., Spitzer Space Telescope/IRAC <i>A Complete Census of Dusty Evolved Stars in Local Group Dwarf Galaxies</i>	2011
Whitney, et al., Spitzer Space Telescope/IRAC (Co-I) <i>Deep GLIMPSE: Exploring the Far Side of the Galaxy</i>	2011
Meixner, et al., Spitzer Space Telescope/IRAC (Co-I) <i>The First Light Curves of the Dustiest Extreme AGB Stars in the LMC and SMC</i>	2011
Boyer, et al., Anglo-Australian Telescope/AAOmega <i>Uncovering the Nature of a New Branch of Anomalous AGB Stars in the SMC</i>	2010
Meixner, et al., Spitzer Space Telescope/IRAC (Co-I) <i>Period Luminosity Relationships and Mass-Loss Rates of AGB Stars</i>	2010
Skillman, et al., LBT/LUCIFER (Co-I & Technical Contact) <i>AGB Star Imaging in LG Dwarf Galaxies for Characterizing Galaxy Evolution</i>	2009
Dalcanton, et al., Hubble Space Telescope/WFC3 (Co-I) <i>A Calibration Database for Stellar Models of AGB Stars</i>	2008
van Loon, et al., Spitzer Space Telescope/IRS (Co-I) <i>Dust Production in ω Centauri</i>	2008
Skillman, et al., Spitzer Space Telescope/IRS (Co-I & Technical Contact) <i>Connecting the Dots: IRS 16-μm Imaging of AGB Stars and ISM Dust in Low Metallicity LG Dwarf Galaxies</i>	2008
Fazio, et al., Spitzer Space Telescope/MIPS (Co-I) <i>Cold Dust in Globular Clusters</i>	2006
van Loon et al., Spitzer Space Telescope/IRAC+MIPS (Co-I) <i>An Atlas of ω Centauri at Mid-Infrared Wavelengths</i>	2005

PROFESSIONAL TALKS

Conferences:

Physical & Chemical Aspects of the Late Stages of Stellar Evolution <i>Stellar Dust Return in the SMC</i>	Aug. 2011
WittFest: Origins and Evolution of Dust <i>Dust Production in the Magellanic Clouds</i>	Oct. 2010
Why Galaxies Care About AGB Stars II <i>AGB Stars in the Small Magellanic Cloud</i>	Aug. 2010
Herschel First Results <i>Extragalactic Evolved Stars in the Sub-millimeter</i>	May 2010

Other Talks:

HotSci@STScI Talk Series, STScI <i>AGB Stars as Probes of the SMC Environment</i>	July 2010
Post-Doc Colloquium, STScI <i>Possible Carbon Dust around Globular Cluster Stars</i>	July 2009
Colloquium, Gemini South <i>Stellar Mass Loss in Low Metallicity Environments</i>	Apr. 2009

OBSERVING EXPERIENCE

Australian Astronomical Observatory: AAT/AAOmega	2010-present
Kitt Peak Observatory: WIYN/WHIRC	2010-present
Large Binocular Telescope Observatory; LUCIFER	2009-present
Magellan Observatory: Clay/MIKE	2007-present
Spitzer Space Telescope: IRAC, IRS and MIPS	2005-present
Mt. Lemmon Observatory: OptiPol	2005-2008
Arecibo Observatory	2002
Kitt Peak Observtory: SARA 0.9 meter	2000

SERVICE

Post-doc Representative STScI: I was on the committee for the HotSci@STScI/CoolSci@STScI talk series at STScI.	2010-2011
STScI Focus Groups STScI: I have served in various focus groups regarding the science atmosphere at STScI.	2009-2010
Graduate Student Representative University of Minnesota: I served as the graduate student representative on the internal committee and contributed to the official report during the external review of the Astronomy Department.	2008

PROFESSIONAL MEMBERSHIPS

HERITAGE Team	SAGE-LMC Team	PHAT Team
SAGE-Spec Team	SAGE-SMC Team	Deep GLIMPSE Team
American Astronomical Society		

COMPUTING SKILLS

AWK/SED	C/C++	UNIX/LINUX
IDL	IRAF	L ^A T _E X/T _E X
Fortran	HTML	Microsoft Office

HONORS AND AWARDS

University of Minnesota:

Dissertation Fellowship	2008-2009
Aneesur Rahman Prize	2008
Louise T. Dosdall Fellowship	2007-2008
Minnesota Space Grant Consortium Scholarship	2003
Barry M. Goldwater National Scholarship	2001-2003
Institute of Technology Merit Scholarship	2001-2002
Phillips Family Scholarship	1999-2001
Presidential Scholarship	1999-2003

REFERENCES

Supervisor: Dr. Karl D. Gordon

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Thesis Co-Advisor: Dr. Evan D. Skillman

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 Minnesota Institute for Astrophysics, School of Physics and Astronomy
 116 Church St SE
 Minneapolis, MN 55455
 skillman@astro.umn.edu / 612-624-9523

Dr. Margaret Meixner

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 3700 San Martin Drive
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 meixner@stsci.edu / 410-338-5013

Dr. Randall S. Jones

Loyola University Maryland
 Physics Department
 4501 N. Charles Street
 Baltimore, MD 21210
 rsj@loyola.edu / 410-617-2706

PUBLICATIONS IN PREPARATION (FIRST AUTHORED)

3. **Boyer, M. L.**, Srinivasan, S., et al.
2011, in preparation
The Dust Budget of the SMC: Are AGB Stars the Primary Dust Source at Low Metallicity?
2. **Boyer, M. L.**, McDonald, I., et al.
2012, in preparation
Anomalous Oxygen-Rich AGB stars in the Magellanic Clouds
1. **Boyer, M. L.**, McDonald, I., et al.
2012, in preparation
Dust Production in the Very-Metal-Poor Globular Cluster M15

REFEREED PUBLICATIONS

28. **Boyer, M. L.**, Srinivasan, S., van Loon, J. Th., McDonald, I., et al.
2011, AJ, 142, 103
Surveying the Agents of Galaxy Evolution in the Tidally Stripped, Low Metallicity Small Magellanic Cloud (SAGE-SMC). II. Cool Evolved Stars
27. McDonald, I., van Loon, J. Th., Sloan, G. C., Dupree, A. K., Zijlstra, A. A., **Boyer, M. L.**, et al.
2011, MNRAS, 417, 20
Spitzer Spectra of Evolved Stars in ω Centauri and Their Low-Metallicity Dust Production
26. Gordon, K. D., Meixner, M., Meade, M. R., Whitney, B., Engelbracht, C., Bot, C., **Boyer, M. L.**, et al.
2011, AJ, 142, 102
Surveying the Agents of Galaxy Evolution in the Tidally Stripped, Low Metallicity Small Magellanic Cloud (SAGE-SMC). I. Overview
25. Olsen, K. A. G., Zaritsky, D., Blum, R. D., **Boyer, M. L.**, & Gordon, K. D.
2011, ApJ, 737, 29
A Population of Accreted Small Magellanic Cloud Stars in the Large Magellanic Cloud
24. McDonald, I., **Boyer, M. L.**, van Loon, J. Th., & Zijlstra, A.
2011, ApJ, 730, 71
Dust Production and Mass Loss in the Galactic Globular Cluster 47 Tucanae
23. McDonald, I., **Boyer, M. L.**, van Loon, J. Th., et al.
2011, ApJS, 193, 23
Fundamental Parameters, Integrated RGB Mass Loss and Dust Production in the Galactic Globular Cluster 47 Tucanae

22. Woods, Paul M., Oliveira, J. M., Kemper, F., van Loon, J. Th., Sargent, B. A., Matsuura, M., Szczerba, R., Volk, K., Zijlstra, A. A., Sloan, G. C., Lagadec, E., McDonald, I., Jones, O., Gorjian, V., Kraemer, K. E., Gielen, C., Meixner, M., Blum, R. D., Sewilo, M., Riebel, D., Shiao, B., Chen, C. -H. R., **Boyer, M. L.**, et al.
2011, MNRAS, 411, 1597
The SAGE-Spec Spitzer Legacy Program: The Life-Cycle of Dust and Gas in the Large Magellanic Cloud. Point Source Classification I
21. **Boyer, M. L.**, Sargent, B., van Loon, J. Th., Srinivasan, S., et al.
2010, A&A, 518, L142
Cold Dust in Three Massive Evolved Stars in the LMC
20. Girardi, L., Williams, B., Gilbert, K., Rosenfield, P., Dalcanton, J., Marigo, P., **Boyer, M. L.**, et al.
2010, ApJ, 724, 1030
The ACS Nearby Galaxy Survey Treasury IX. Constraining Asymptotic Giant Branch Evolution With Old Metal-Poor Galaxies
19. Clayton, G. C., Sargent, B., **Boyer, M. L.**, et al.
2010, ApJ, 722, 1131
Herschel Observations of a Newly Discovered UX Ori Star in the LMC
18. McDonald, I., van Loon, J. Th., Dupree, A. K. & **Boyer, M. L.**
2010, MNRAS, 405, 1711
Discovery of Long-Period Variable Stars in the Very Metal-poor Globular Cluster M15
17. Meixner, M., Galliano, F., Hony, S., Roman-Duval, J., Robitaille, T., Panuzzo, P., Sauvage, M., Gordon, K., Engelbracht, C., Misselt, K., Okumura, K., Beck, T., Bernard, J.-P., Bolatto, A., Bot, C., **Boyer, M. L.**, et al.
2010, A&A, 518, L71
HERshcel Inventory of The Agents of Galaxy Evolution (HERITAGE): The LMC
16. Kemper, F., Woods, P., M., Antoniou, V., Bernard, J.-P., Blum, R., **Boyer, M. L.**, et al.
2010, PASP, 122, 683
The SAGE-Spec Spitzer Legacy Program: The Life Cycle of Dust and Gas in the Large Magellanic Cloud
15. **Boyer, M. L.**, van Loon, J. Th., McDonald, I., Gordon, K. D., et al.
2010, ApJL, 711, 99
Is Dust Forming on the Red Giant Branch in 47 Tuc?
14. van Loon, J. Th., Oliveira, J., Gordon, K., Meixner, M., Shiao, B., **Boyer, M. L.**, et al.
2010, AJ, 139, 68
A Spitzer Space Telescope Far-Infrared Spectral Atlas of Compact Sources in the Magellanic Clouds. I. The Large Magellanic Cloud

13. Oliveira, J., M., van Loon, J. Th., Chen, C.-H., R., Tielens, A. G. G. M., Sloan, G. C., Woods, Paul M., Kemper, F., Indebetouw, R., Gordon, K. D., **Boyer, M. L.**, et al.
2009, ApJ, 707, 1269
Ice Chemistry in Embedded Young Stellar Objects in the Large Magellanic Cloud
12. **Boyer, M. L.**, McDonald, I., van Loon, J. Th., Gordon, K. D., et al.
2009, ApJ, 705, 746
Dust Production and Mass Loss in the Galactic Globular Cluster NGC 362
11. **Boyer, M. L.**, Skillman, E. D., van Loon, J. Th., Gehrz, R. D. & Woodward, C. E.
2009, ApJ, 697, 1993
A Spitzer Study of Asymptotic Giant Branch Stars. III. Dust Production and Gas Return in Local Group Dwarf Irregular Galaxies
10. McDonald, I., van Loon, J. Th., Decin, L., **Boyer, M. L.**, Dupree, A. K., Evans, A., Gehrz, R. D. & Woodward, C. E.
2009, MNRAS, 394, 831
Giants in the Globular Cluster ω Centauri: Dust production, Mass Loss and Distance
9. Barmby, P., **Boyer, M. L.**, Woodward, C. E., Gehrz, R. D., van Loon, J. Th., Fazio, G., Marengo, M. & Polomski, E.
2009, AJ, 137, 207
A Spitzer Search for Cold Dust within Globular Clusters
8. van Loon, J. Th., **Boyer, M. L.** & McDonald, I.
2008, ApJL, 680, 49
Spitzer Space Telescope Evidence in NGC 6791: No Super Mass Loss at Supersolar Metallicity to Explain Helium White Dwarfs?
7. **Boyer, M. L.**, McDonald, I., van Loon, J. Th., Woodward, C. E., Gehrz, R. D., Evans, A. & Dupree, A. K.
2008, AJ, 135, 1395
A Spitzer Space Telescope Atlas of ω Centauri: The Stellar Population, Mass Loss, and the Intracluster Medium
6. van Loon, J. Th., van Leeuwen, F., Smalley, B., Smith, A. W., Lyons, N. A., McDonald, I. & **Boyer, M. L.**
2007, MNRAS, 382, 1353
A Spectral Atlas of Post-Main-Sequence Stars in Omega Centauri: Kinematics, Evolution, Enrichment and Interstellar Medium
5. **Boyer, M. L.**, Woodward, C. E., van Loon, J. Th., Gordon, K. D., Evans, A., Gehrz, R. D., Helton, L. A. & Polomski, E. F.
2006, AJ, 132, 1415
Stellar Populations and Mass Loss in M15: A Spitzer Space Telescope Detection of Dust in the Intracluster Medium

4. van Loon, J. Th., McDonald, I., Oliveira, J. M., Evans, A., **Boyer, M. L.**, Gehrz, R. D., Polomski, E. & Woodward, C. E.
2006, A&A, 450, 339
The First 8-13 μm Spectra of Globular Cluster Red Giants: Circumstellar Silicate Dust Grains in 47 Tucanae (NGC 104)
3. Jones, T. J., Woodward, C. E., **Boyer, M. L.**, Gehrz, R. D. & Polomski, E.
2005, ApJ, 620, 731
Spitzer IRAC Observations of Star Formation in N159 in the Large Magellanic Cloud
2. Kepler, S. O. **et al.**
2003, A&A, 401, 639
The Everchanging Pulsating White Dwarf GD358
1. Kepler, S. O. **et al.**
2003, BaltA, 12, 45
WET Observations of GD358 in 2000

PUBLISHED PROCEEDINGS

14. **Boyer, M. L.**, & The SAGE-SMC Legacy Team
2011, American Astronomical Society Meeting 217, Seattle, WA, 154.04, Bulletin of the American Astronomical Society, Vol. 43
AGB Stars in the Magellanic Clouds: Dust Production and Mass Loss
13. **Boyer, M. L.**, Srinivasan, S., et al.
2011, Why Galaxies Care About AGB Stars II: Shining Examples and Common Inhabitants, Vienna, Austria, ASP, p. 473
AGB Stars in the Small Magellanic Cloud
12. **Boyer, M. L.**, & The SAGE-SMC Legacy Team
2010, American Astronomical Society Meeting 215, Washington D.C., 459.04, Bulletin of the American Astronomical Society, Vol. 42
A Spitzer SAGE Overview of Evolved Stars in the Small Magellanic Cloud
11. McDonald, I., van Loon, J. Th., & **Boyer, M. L.**
2009, American Institute of Physics Conference Series, 1094, 876
Metallicity, Pulsation and Mass Loss in Globular Cluster Low-mass AGB Stars
10. Barmby, P., Marengo, M., van Loon, J. Th., Polomski, E., Fazio, G., Gehrz, R. D., Woodward, C. E., & **Boyer, M. L.**
2008, 37th COSPAR Scientific Assembly, 37, 191
The Elusive Intracluster Medium in Globular Clusters
9. **Boyer, M. L.**, McDonald, I., van Loon, J. Th., Woodward, C. E., Gehrz, R. D., Evans, A., & Dupree, A. K.

- 2008, American Astronomical Society Meeting 211, Austin, TX, 58.07, Bulletin of the American Astronomical Society, Vol. 39
A Spitzer Space Telescope Atlas of Omega Centauri
8. Barmby, P., **Boyer, M. L.**, Bono, G., Ferraro, I., & Marengo, M.
2006, American Astronomical Society Meeting 209, Seattle, WA, 26.12, Bulletin of the American Astronomical Society, Vol. 38
Spitzer Observations of Galactic Globular Clusters
 7. Polomski, E., Gehrz, R. D., Woodward, C. E., Humphreys, R. M., **Boyer, M. L.**, et al.
2006, The Spitzer Space Telescope: New Views of the Cosmos ASP Conference Series, 357, 196
Multi-Epoch Imaging and Spectroscopy of M33
 6. **Boyer, M. L.**, Woodward, C. E., van Loon, J. Th., Polomski, E., Gehrz, R. D., Evans, A., & Gordon, K.
2005, American Astronomical Society Meeting 206, Minneapolis, MN, 36.03, Bulletin of the American Astronomical Society, Vol. 37
Mass Loss from the Evolved Stellar Population in M15
 5. Gehrz, R. D., Polomski, E., Woodward, C. E., McQuinn, K., **Boyer, M. L.**, Humphreys, R. M., et al.
2005, American Astronomical Society Meeting 206, Minneapolis, MN, 13.01, Bulletin of the American Astronomical Society, Vol. 37
Spitzer Images and Spectroscopy of M33
 4. **Boyer, M. L.**, Woodward, C., Gehrz, R., Polomski, E., van Loon, J. Th., & Evans, A.
2004, American Astronomical Society Meeting 205, San Diego, CA, 23.10
Spitzer Space Telescope IRAC Imagery of ω Centauri
 3. Jones, T. J., Woodward, C. E., **Boyer, M. L.**, Gehrz, R. D., & Polomski, E.
2004, American Astronomical Society Meeting 205, San Diego, CA, 93.08, Bulletin of the American Astronomical Society, Vol. 36
Spitzer Observations of Star Formation in N159 in the LMC
 2. Polomski, E., Gehrz, R. D., Woodward, C. E., **Boyer, M. L.**, & Roellig, T. L.
2004, American Astronomical Society Meeting 205, San Diego, CA, 71.14, Bulletin of the American Astronomical Society, Vol. 36
Spitzer Observations of SN 1987A
 1. **Boyer, M. L.** & Gupta, Y.
2002, American Astronomical Society Meeting 201, Seattle, WA, 118.03, Bulletin of the American Astronomical Society, Vol. 34
A Study of the Pulsar Emission Region at Multiple Frequencies