

## Michael P. Fitzgerald

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CONTACT INFORMATION	Department of Physics and Astronomy Physics and Astronomy Building, P.O. Box 951547 University of California, Los Angeles Los Angeles, CA 90095-1547 USA	<i>Voice:</i> (310) 206-7853 <i>Fax:</i> (310) 206-7254 <i>E-mail:</i> mpfitz@ucla.edu
RESEARCH INTERESTS	Formation and evolution of circumstellar material, particularly extrasolar planets. Indirect and direct techniques for detection and characterization of planetary systems. High-contrast imaging of circumstellar debris. Design and construction of astronomical instruments.	
EDUCATION	<b>University of California, Berkeley</b> Ph.D., Astrophysics, 2007 M.A., Astrophysics, 2002  <b>California Institute of Technology</b> B.S., Engineering and Applied Science, 2000	
TECHNICAL PROJECTS	Co-Principal Investigator, Keck HISPEC instrument Co-Principal Investigator, TMT MODHIS instrument Co-Investigator, Keck LIGER instrument Co-Lead Organizer, TMT Planetary Systems Imager instrument Co-Principal Investigator, NIRSPEC Upgrade project Principal Investigator, OSIRIS Imager Upgrade project Lead Co-Investigator, Precision Near-Infrared Radial Velocities with NIRSPEC (concept study) Co-Investigator, Keck Adaptive Optics Optimization Project Lead Co-Investigator, Gemini Planet Imager Exoplanet Survey	<b>2019 – present</b> <b>2018 – present</b> <b>2017 – present</b> <b>2016 – present</b> <b>2015 – 2020</b> <b>2013 – 2020</b> <b>2013 – 2015</b> <b>2011 – present</b> <b>2011 – present</b>
SELECTED ROLES AND ACTIVITIES	Director, UCLA Infrared Laboratory Associate Director, University of California Observatories Co-Chair, Keck Observatory Adaptive Optics Future Study Group Keck Observatory Science Steering Committee Member University of California Observatories Advisory Committee Member UCLA Chapter Lead, Institute for Scientist and Engineer Educators	<b>2020 – present</b> <b>2020 – present</b> <b>2019 – present</b> <b>2018 – present</b> <b>2017 – present</b> <b>2013 – 2020</b>
OTHER PROFESSIONAL ACTIVITY HIGHLIGHTS	Co-Lead Organizer, “Getting to Know Your Adaptive Optics System,” CfAO Retreat Co-Lead Organizer, High-Contrast Imaging Session, Center for Adaptive Optics Retreat Lead Organizer, High-Contrast Imaging Session, Center for Adaptive Optics Retreat Lead Organizer, High-Contrast Imaging Session, Center for Adaptive Optics Retreat Co-Lead, Keck Institute for Space Studies Workshop, “Exoplanet Imaging and Characterization: Coherent Differential Imaging and Signal Detection Statistics”	<b>2020</b> <b>2019</b> <b>2018</b> <b>2017</b> <b>Aug., Dec. 2016</b>
HONORS AND AWARDS	UCLA Dept. of Physics & Astronomy Teaching Award (Astro 180) NASA Group Achievement Award, Exoplanet Laser Frequency Comb Team UCLA Dept. of Physics & Astronomy Teaching Award (Astro 3)	<b>Fall 2017</b> <b>2017</b> <b>Spring 2017</b>

UCLA Dept. of Physics & Astronomy Teaching Award (Astro 180)	<b>Winter 2017</b>
UCLA Dept. of Physics & Astronomy Teaching Award (Astro 180)	<b>Spring 2016</b>
UCLA Dept. of Physics & Astronomy Teaching Award (Astro 283)	<b>Winter 2016</b>
UCLA Dept. of Physics & Astronomy Teaching Award (Astro 283)	<b>Winter 2014</b>
2008–2009 AAAS Newcomb Cleveland Prize	<b>2010</b>
Michelson Postdoctoral Fellow	<b>September, 2007 – June, 2010</b>

ACADEMIC  
EXPERIENCE

**University of California, Los Angeles**

<i>Professor</i>	<b>July, 2021 – present</b>
<i>Associate Professor</i>	<b>July, 2015 – June, 2021</b>
<i>Assistant Professor</i>	<b>July, 2009 – June, 2015</b>

Research includes adaptive optics, coronagraphy, near- and mid-infrared imaging of circumstellar debris disks and extrasolar planets, and the design and construction of astronomical instrumentation. Member of the Infrared Laboratory. Instructor in the Department of Physics and Astronomy.

- Astronomy 3 — Nature of the Universe (Spring 2012, Spring 2014, Winter 2015, Spring 2017, Winter 2019)
- Astronomy 283 — Numerical and Statistical Methods in Astronomy (Winter 2012, Winter 2013, Winter 2014, Winter 2016, Winter 2018, Winter 2020)
- Astronomy 180 — Astrophysics Laboratory (Winter 2011, Fall 2011, Fall 2012, Fall 2013, Fall 2014, Spring 2016, Winter 2017, Fall 2017, Fall 2018, Fall 2019)
- Physics 5A — Physics for Life Sciences Majors: Mechanics and Energy (Spring 2018)
- Physics 6A — Physics for Life Sciences Majors: Mechanics (Spring 2015)

**Lawrence Livermore National Laboratory**

<i>Michelson Postdoctoral Fellow</i>	<b>September, 2007 – June, 2010</b>
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Research includes adaptive optics coronagraphy and mid-infrared imaging of circumstellar debris disks and extrasolar planets. Optical and opto-mechanical design of an adaptive optics polarimeter. Advised by Dr. Bruce Macintosh.

**University of California, Berkeley**

<i>Graduate Student</i>	<b>August, 2000 – August, 2007</b>
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Ph.D. research and graduate-level coursework in astrophysics. Course topics included radiation processes, gas and fluid dynamics, instrumentation, stellar structure and evolution, the interstellar medium, stellar dynamics and galactic structure, cosmology, and astrophysical computational techniques. Scientific research included study of circumstellar debris through adaptive optics coronagraphy, detection of substellar companions, and high-precision astrometry with adaptive optics. A particular emphasis was on advancing experimental technique. Instrumentation work included implementation of new detector readout schemes on the IRCAL camera, and development of a point-spread function reconstructor on the Lick adaptive optics system. Primarily advised by Professor James Graham.

<i>Graduate Student Instructor</i>	<b>August – December, 2002</b>
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Head graduate student instructor conducting upper-level undergraduate optical astronomy laboratory.

- AY 120 — Optical Astronomy Laboratory (Fall 2002)

<i>Graduate Student Instructor</i>	<b>August, 2000 – May, 2001</b>
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Conducted discussion sections and office hours for introductory astronomy courses.

- AY 12 — The Planets (Spring 2001)
- AY 10 — Introduction to Astronomy (Fall 2000)

## California Institute of Technology

*Undergraduate Student*

September, 1996 – June, 2000

Courses included classical and quantum physics, mechanical engineering, electrical engineering (emphasis on digital circuits), optics (including astronomical instrumentation), continuous and discrete-time signal processing, computational and neural systems, applied mathematics, and control of dynamical systems.

### PUBLICATIONS

Jensen-Clem, R., Hinz, P. M., van Kooten, M. A. M., **Fitzgerald, M. P.**, Sallum, S., Mazin, B. A., Chun, M., Max, C., Millar-Blanchaer, M., Skemer, A., Wang, J., Stelter, R. D., and Guyon, O. “The Planetary Systems Imager Adaptive Optics System: An Initial Optical Design and Performance Analysis Tools for the PSI-Red AO System.” *Proceedings of the SPIE*, submitted.

Males, J. R., **Fitzgerald, M. P.**, Belikov, R., and Guyon, O. “The Mysterious Lives Of Speckles. I. Residual atmospheric speckle lifetimes in ground-based coronagraphs.” *Publications of the Astronomical Society of the Pacific*, 133 (2021): 104504 (18pp).

Wang, J. J., Ruffio, J.-B., Morris, E., Delorme, J.-R., Jovanovic, N., Pezzato, J., Echeverri, D., Finnerty, L.,<sup>†</sup> Hood, C., Zanazzi, J. J., Bryan, M. L., Bond, C. Z., Cetre, S., Martin, E. C., Mawet, D., Skemer, A., Baker, A., Xuan, W. J., Bartos, R., Blake, G. A., Boden, A., Buzard, C., Calvin, B.,<sup>†</sup> Chun, M., Doppmann, G., Dupuy, T., Duchêne, G., Feng, Y. K., **Fitzgerald, M. P.**, Fortney, J., Freedman, R. S., Knutson, H., Konopacky, Q., Lilley, S., Liu, M., Lopez, R.,<sup>†</sup> Lupu, R., Marley, M. S., Meshkat, T., Miles, B., Millar-Blanchaer, M., Ragland, S., Roy, A., Sappéy, B., Schofield, T., Wallace, J. K., Wang, J., Weiss, L., Wetherell, E., Wizinowich, P. and Ygouf, M. “Detection and Bulk Properties of the HR 8799 Planets with High Resolution Spectroscopy.” *Astronomical Journal*, 162 (2021): 148 (24pp).

Delorme, J.-R., Jovanovic, N., Echeverri, D., Mawet, D., Wallace, J. K., Bartos, R., Cetre, S., Wizinowich, P., Ragland, S., Wang, J., Ruffio, J.-R., Lilley, S., Wetherell, E., Doppmann, G., Martin, E., **Fitzgerald, M.**, Ruane, G., Schofield, T., Suominen, N., Calvin, B., Morris, E., Wang, E., Magnone, K., Johnson, C., Sohn, J., Lopez, R.,<sup>†</sup> Bond, C. Z., Pezzato, J., Llop Sayson, J., Chun, M., and Skemer, A. “The Keck Planet Imager and Characterizer: A dedicated single-mode fiber injection unit for high resolution exoplanet spectroscopy.” *Journal of Astronomical Telescopes, Instruments, and Systems*, 7 (2021): 035006 (25pp)

Crotts, K. A., Matthews, B. C., Esposito, T. M., Duchêne, G., Kalas, P., Chen, C. H., Arriaga, P.,<sup>†</sup> Millar-Blanchaer, M. A., Debes, J. H., Draper, Z. H., **Fitzgerald, M. P.**, Hom, J., MacGregor, M. A., Mazoyer, J., Patience, J., Rice, M., Weinberger, A. J., Wilner, D. J., and Wolff, S. “A Deep Polarimetric Study of the Asymmetrical Debris Disk HD 106906.” *Astrophysical Journal*, 915 (2021): 58 (14pp).

Lin, J.,<sup>†</sup> Jovanovic, N., and **Fitzgerald, M. P.** “Designing photonic lanterns for diffraction-limited spectrometry.” *Journal of the Optical Society of America B*, 38 (2021): A51 (13pp).

Doelman, D. S., Wardenier, J. P., Tuthill, P., **Fitzgerald, M. P.**, Canfield, J., Johnston, B., Lyke, J., Sallum, S., Norris, B., Wizinowich, P., Liu, M., Keller, C., Escuti, M. J., and Snik, F. “Design and Performance Analysis of a prototype Holographic Aperture Mask for the Keck OSIRIS Imager.” *Astronomy & Astrophysics*, 649 (2021): A168 (16pp).

Guyon, O., Lozi, J., Vievard, S., Belikov, R., Bendek, E., Bos, S., Currie, T., Deo, V., **Fitzgerald, M.**, Gratadour, D., Groff, T., Jovanovic, N., Kawahara, H., Kotani, T., Kudo, T., Lopez, C., Ltaief, H., Males, J., Martinache, F., Martinod, M.-A., Mazin, B. A., Miller, K., Norris, B., Ndiaye, M., Pluzhnyk, E., Sahoo, A., Sevin, A., Skaf, N., Snik, F., Tamura, M., and Wong, A. “Validating

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<sup>†</sup>Student under supervision

advanced wavefront control techniques on the SCExAO testbed/instrument.” *Proceedings of the SPIE*, 11448 (2020): 114481Z (15pp).

López, R. A.,<sup>†</sup> Hoffman, E. B.,<sup>†</sup> Doppmann, G., **Fitzgerald, M. P.**, Johnson, C., Kassis, M., Lanclos, K., Lyke, J., Martin, E. C., McLean, I., Sohn, J.M., and Weiss, J. “Characterization and performance of the upgraded NIRSPEC on the W. M. Keck Telescope.” *Proceedings of the SPIE*, 11447 (2020): 114476B (15pp).

Stelter, R. D., Skemer, A. J., Sallum, S., Kupke, R., Hinz, P., Mawet, D., Jensen-Clem, R., Ratliffe, C., MacDonald, N., Deich, W., Kruglikov, G., Kassis, M., Lyke, J., Briesemeister, Z., Miles, B., Gerard, B., **Fitzgerald, M.**, Brandt, T., and Marois, C. “Update on the preliminary design of SCALES: the Santa Cruz Array of Lenslets for Exoplanet Spectroscopy.” *Proceedings of the SPIE*, 11447 (2020): 1144764 (24pp).

De Rosa, R. J., Esposito, T. M., Gibbs, A.,<sup>†</sup> Bailey, V. P., **Fitzgerald, M. P.**, Chilcote, J., Duchêne, G., Konopacky, Q., Macintosh, B., Millar-Blanchaer, M. A., Nguyen, M. M., Nielsen, E. L., Perrin, M. D., Rameau, J., and Wang, J. J. “Gemini Planet Imager observational calibrations XV: instrument calibrations after six years on sky.” *Proceedings of the SPIE*, 11447 (2020): 114475A (13pp).

Wiley, J., Mathur, K., Brown, A., Wright, S., Cosens, M., Maire, J., **Fitzgerald, M.**, Jones, T., Kassis, M., Kress, E., Kupke, R., Larkin, J. E., Lyke, J., Wang, E., and Yeh, S. “Liger for next-generation Keck adaptive optics: opto-mechanical dewar for imaging camera and slicer.” *Proceedings of the SPIE*, 11447 (2020): 1144758 (8pp).

Cosens, M., Wright, S. A., Arriaga, P., Brown, A., **Fitzgerald, M.**, Jones, T., Kassis, M., Kress, E., Kupke, R., Larkin, J. E., Lyke, J., Wang, E., Wiley, J., and Yeh, S. “Liger for next-generation Keck AO: filter wheel and pupil design.” *Proceedings of the SPIE*, 11447 (2020): 114474X (9pp).

Delorme, J.-R., Jovanovic, N., Echeverri, D., Mawet, D., Wallace, J. K., Bartos, R. D., Cetre, S., Wizinowich, P., Ragland, S., Wang, J., Ruffio, J.-B., Lilley, S., Wethrell, E., Doppmann, G., **Fitzgerald, M.**, Ruane, G., Schofield, T., Calvin, B., Morris, E., Pezzato, J., Llop Sayson, J., Magnone, K., Johnson, C., Sohn, J., Bond, C. Z., Chun, M., Suominen, N., and Skemer, A. “The Keck Planet Imager and Characterizer: A dedicated single-mode fiber injection unit for high resolution exoplanet spectroscopy.” *Proceedings of the SPIE*, 11447 (2020): 114471P (27pp).

Ward-Duong, K., Patience, J., Follette, K., De Rosa, R. J., Rameau, J., Marley, M., Saumon, D., Nielsen, E. L., Rajan, A., Greenbaum, A. Z., Lee, J., Wang, J. J., Czekala, I., Duchêne, G., Macintosh, B., Ammons, S. M., Bailey, V. P., Barman, T., Bulger, J., Chen, C., Chilcote, J., Cotten, T., Doyon, R., Esposito, T. M., **Fitzgerald, M. P.**, Gerard, B. L., Goodsell, S. J., Graham, J. R., Hibon, P., Hom, J., Hung, L.-W., Ingraham, P., Kalas, P., Konopacky, Q., Larkin, J. E., Maire, J., Marchis, F., Marois, C., Metchev, S., Millar-Blanchaer, M. A., Oppenheimer, R., Palmer, D., Perrin, M., Poyneer, L., Pueyo, L., Rantakyö, F. T., Ren, B., Ruffio, J.-B., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Tallis, M., Thomas, S., Wallace, J. K., Wiktorowicz, S., and Wolff, S. “Gemini Planet Imager Spectroscopy of the Dusty Substellar Companion HD 206893 B.” *Astronomical Journal*, 161 (2021): 5 (24pp).

Chen, C., Mazoyer, J., Poteet, C. A., Ren, B., Duchêne, G., Hom, J., Arriaga, P.,<sup>†</sup> Millar-Blanchaer, M. A., Arnold, J., Bailey, V. P., Bruzzone, J. S., Chilcote, J., Choquet, E., DeRosa, R. J., Draper, Z. H., **Fitzgerald, M. P.**, Esposito, T. M., Follette, K. B., Hibon, P., Hines, D. C., Kalas, P., Marchis, F., Matthews, B., Milli, J., Patience, J., Perrin, M. D., Pueyo, L., Rajan, A., Rantakyö, F. T., Rodigas, T. J., Roudier, G. M., Schneider, G., Soummer, R., Stark, C., Wang, J. J., Ward-Duong, K., Weinberger, A. J., Wilner, D. J., and Wolff, S. “Multi-Band GPI Imaging of the HR 4796A Debris Disk.” *Astrophysical Journal*, 898 (2020): 55 (34pp).

Arriaga, P.,<sup>†</sup> **Fitzgerald, M. P.**, Duchêne, G., Kalas, P., Millar-Blanchaer, M. A., Perrin, M. D., Chen, C. H., Mazoyer, J., Ammons, M., Bailey, V. P., Barman, T. S., Bulger, J., Chilcote, J. K., Cotten, T., De Rosa, R. J., Doyon, R., Esposito, T. M., Follette, K. B., Gerard, B. L., Goodsell, S., Graham, J. R., Greenbaum, A. Z., Hibon, P., Hom, J., Hung, L.-W., Ingraham, P., Konopacky, Q. M., Macintosh, B. A., Maire, J., Marchis, F., Marley, M. S., Marois, C., Metchev, S., Nielsen, E. L., Oppenheimer, R. Palmer, D. W., Patience, J., Poyneer, L. A., Pueyo, L., Rajan, A., Rameau, J., Rantakyro, F. T., Ruffio, J.-B., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Wang, J. J., Ward-Duong, K., and Wolff, S. G. “Multiband Polarimetric Imaging of HR 4796A with the Gemini Planet Imager.” *Astronomical Journal*, 160 (2020): 79 (13pp).

Esposito, T. M., Kalas, P., **Fitzgerald, M. P.**, Millar-Blanchaer, M. A., Duchene, G., Patience, J., Hom, J., Perrin, M. D., De Rosa, R. J., Chiang, E., Czekala, I., Macintosh, B., Graham, J. R., Ansdell, M., Arriaga, P.,<sup>†</sup> Bruzzone, S., Bulger, J., Chen, C. H., Cotten, T., Dong, R., Draper, Z. H., Follette, K. B., Hung, L.-W., Lopez, R.,<sup>†</sup> Matthews, B. C., Mazoyer, J., Metchev, S., Rameau, J., Ren, B., Rice, M., Song, I., Stahl, K.,<sup>†</sup> Wang, J., Wolff, S., Zuckerman, B., Ammons, S. M., Bailey, V. P., Barman, T., Chilcote, J., Doyon, R., Gerard, B. L., Goodsell, S. J., Greenbaum, A. Z., Hibon, P., Hinkley, S., Ingraham, P., Konopacky, Q., Maire, J., Marchis, F., Marley, M. S., Marois, C., Nielsen, E. L., Oppenheimer, R., Palmer, D., Poyneer, L., Pueyo, L., Rajan, A., Rantakyro, F. T., Ruffio, J.-B., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Soummer, R., Thomas, S., and Ward-Duong, K. “Debris Disk Results from the Gemini Planet Imager Exoplanet Survey’s Polarimetric Imaging Campaign.” *Astronomical Journal*, 160 (2020): 24 (44pp).

Duchêne, G., Rice, M., Hom, J., Zalesky, J., Esposito, T. M., Millar-Blanchaer, M. A., Ren, B., Kalas, P., **Fitzgerald, M. P.**, Arriaga, P.,<sup>†</sup> Bruzzone, S., Bulger, J., Chen, C. H., Chiang, E., Cotten, T., Czekala, I., De Rosa, R. J., Dong, R., Draper, Z. H., Follette, K. B., Graham, J. R., Hung, L.-W., Lopez, R.,<sup>†</sup> Macintosh, B., Matthews, B. C., Mazoyer, J., Metchev, S., Patience, J., Perrin, M. D., Rameau, J., Song, I., Stahl, K.,<sup>†</sup> Wang, J., Wolff, S., Zuckerman, B., Ammons, S. M., Bailey, V. P., Barman, T., Chilcote, J., Doyon, R., Gerard, B. L., Goodsell, S. J., Greenbaum, A. Z., Hibon, P., Ingraham, P., Konopacky, Q., Maire, J., Marchis, F., Marley, M. S., Marois, C., Nielsen, E. L., Oppenheimer, R., Palmer, D., Poyneer, L., Pueyo, L., Rajan, A., Rantakyro, F. T., Ruffio, J.-B., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Soummer, R., Thomas, S., and Ward-Duong, K. “The Gemini Planet Imager View of the HD 32297 Debris Disk.” *Astronomical Journal*, 159 (2020): 251 (21pp).

Nguyen, M. M., De Rosa, R. J., Wang, J. J., Esposito, T. M., Kalas, P., Graham, J. R., Macintosh, B., Bailey, V. P., Barman, T., Bulger, J., Chilcote, J., Cotten, T., Doyon, R., Duchêne, G., **Fitzgerald, M. P.**, Follette, K. B., Gerard, B. L., Goodsell, S. J., Greenbaum, A. Z., Hibon, P., Hom, J., Hung, L.-W., Ingraham, P., Konopacky, Q., Larkin, J. E., Maire, J., Marchis, F., Marley, M. S., Marois, C., Metchev, S., Millar-Blanchaer, M. A., Nielsen, E. L., Oppenheimer, R., Palmer, D., Patience, J., Perrin, M., Poyneer, L., Pueyo, L., Rajan, A., Rameau, J., Rantakyro, F. T., Ren, B., Ruffio, J.-B., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Tallis, M., Thomas, S., Wallace, J. K., Ward-Duong, K., Wiktorowicz, S., and Wolff, S. “HD 165054: An Astrometric Calibration Field for High-contrast Imagers in Baade’s Window.” *Astronomical Journal*, 159 (2020): 244 (14pp).

De Rosa, R. J., Nguyen, M. M., Chilcote, J., Macintosh, B., Perrin, M. D., Konopacky, Q., Wang, J. J., Duchêne, G., Nielsen, E. L., Rameau, J., Ammons, S. M., Bailey, V. P., Barman, T., Bulger, J., Cotten, T., Doyon, R., Esposito, T. M., **Fitzgerald, M. P.**, Follette, K. B., Gerard, B. L., Goodsell, S. J., Graham, J. R., Greenbaum, A. Z., Hibon, P., Hung, L.-W., Ingraham, P., Kalas, P., Larkin, J. E., Maire, J., Marchis, F., Marley, M. S., Marois, C., Metchev, S., Millar-Blanchaer, M. A., Oppenheimer, R., Palmer, D., Patience, J., Poyneer, L., Pueyo, L., Rajan, A., Rantakyro, F. T., Ruffio, J.-B., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Wallace, J. K., Ward-Duong, K., Wiktorowicz, S., and Wolff, S. “Revised astrometric

calibration of the Gemini Planet Imager.” *Journal of Astronomical Telescopes, Instruments, and Systems*, 6 (2020): 015006 (31pp).

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**Fitzgerald, M. P.**, Kalas, P., Graham, J. R. “Orbital Constraints on the  $\beta$  Pic Inner Planet Candidate with Keck Adaptive Optics.” *Astrophysical Journal* 706 (2009): L41–45.

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Maness, H. L., **Fitzgerald, M. P.**, Paladini, R., Kalas, P., Duchêne, G., Graham, J. R. “CARMA Millimeter-Wave Aperture Synthesis Imaging of the HD 32297 Debris Disk,” *Astrophysical Journal* 686 (2008): L25–28.

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**Fitzgerald, M. P.**, Kalas, P. G., Graham, J. R. “A Ring of Warm Dust in the HD 32297 Debris Disk,” *Astrophysical Journal* 670 (2007): 557–564.

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Kalas, P., Graham, J. R., Clampin, M. C., and **Fitzgerald, M. P.** “First Scattered Light Images of Debris Disks around HD 53143 and HD 139664,” *Astrophysical Journal* 637 (2006): L57–60.

**Fitzgerald, M. P.**, and Graham, J. R. “Speckle Statistics in Adaptively Corrected Images,” *Astrophysical Journal* 637 (2006): 541–547.

SELECTED  
PRESENTATIONS

Fitzgerald, M. P. “Future with Large Telescopes (TMT+)” Kavili ExoFrontiers Forum, Cambridge, UK, June 2019 (invited).

Fitzgerald, M. P. “Overview of the Planetary Systems Imager” Adaptive Optics for Extremely Large Telescopes 6, Quebec City, Canada, July 2019.

Fitzgerald, M. P. “Project Update for the Planetary Systems Imager” Thirty Meter Telescope Science Forum, Pasadena, California, USA, December 2018.

Fitzgerald, M. P. “The planetary systems imager: a high-contrast instrumentation platform for the Thirty Meter Telescope” SPIE Astronomical Telescopes and Instrumentation, Austin, Texas, USA, June 2018.

Fitzgerald, M. P. “A Program for High-Contrast Imaging at TMT” Thirty Meter Telescope Science Forum, Mysore, India, November 2017.

Fitzgerald, M. P. “TMT High-Contrast Exoplanet Science” Thirty Meter Telescope Science Forum, Kyoto, Japan, May 2016 (invited).

Fitzgerald, M. P. “An Instrument for Imaging and Spectroscopy of Planetary Systems with TMT,” Adaptive Optics for ELTs 4, Lake Arrowhead, California, USA, October 2015.

Fitzgerald, M. P. “The Gemini Planet Imager Exoplanet Survey Debris Disk Imaging Campaign,” The Sprit of Lyot 2015, Montreal, Canada, June.

Fitzgerald, M. P. “Revealing Planet Formation through High-Contrast Imaging of Exoplanets and Circumstellar Debris,” University of Toronto, Canada, November 2014 (invited).

Fitzgerald, M. P. “Revealing Planet Formation through High-Contrast Imaging of Exoplanets and Circumstellar Debris,” University of California, Los Angeles, USA, October 2014 (invited).

Fitzgerald, M. P. “Planet Formation Revealed by High-Contrast Imaging,” California State University, Long Beach, USA, April 2014 (invited).

Fitzgerald, M. P. “Formation of Extrasolar Planets,” Gemini North Adaptive Optics Workshop, Victoria, BC, Canada, June 2012 (invited).

Fitzgerald, M. P. “High-Contrast Imaging of Extrasolar Planets and Circumstellar Debris,” California State University, Los Angeles, USA, May 2012 (invited).

Fitzgerald, M. P. “Gemini Planet Imager: Instrument Status and Campaign Overview,” Center for Adaptive Optics Fall Retreat, Lake Arrowhead, California, USA, November 2011.

Fitzgerald, M. P. “High Spatial Resolution Imaging of a Dynamically Perturbed Debris Disk,” Extreme Solar Systems II, Jackson, Wyoming, USA, September 2011.

Fitzgerald, M. P. “Adaptive Optics Imaging of Circumstellar Debris Disks,” OCIW Colloquium, Pasadena, California, USA, June 2011 (invited).

Fitzgerald, M. P. “Adaptive Optics Imaging of Circumstellar Debris Disks,” Caltech Astronomy Colloquium, May 2011 (invited).

Fitzgerald, M. P. “High-Contrast Imaging of Circumstellar Disks,” Center for Adaptive Optics Fall Retreat, Lake Arrowhead, California, USA, November 2009 (invited review).

Fitzgerald, M. P. “High-Contrast Imaging Orbital Constraints of the  $\beta$  Pic b Planet Candidate,” 2009 Sagan/Michelson Fellows Symposium, Pasadena, California, USA, November 2009 (invited).

Fitzgerald, M. P. “Adaptive Optics Coronagraphy of Circumstellar Debris Disks,” 214th Meeting of the American Astronomical Society, Pasadena, California, USA, June 2009 (invited).

Fitzgerald, M. P. “Tracing Planet Formation through Circumstellar Debris,” University of California, Los Angeles, USA, April 2009 (invited).

Fitzgerald, M. P., Graham, J. R., Kalas, P. G., Duchêne, G. “Thermal Emission from a Newly Resolved Debris Disk: HD 131835,” 213th Meeting of the American Astronomical Society, Long Beach, California, USA, January 2009.

Fitzgerald, M. P., Graham, J. R., Kalas, P. G., Duchêne, G. “Thermal Emission from a Newly Resolved Debris Disk: HD 131835,” New Light on Young Stars: Spitzer’s View of Circumstellar Disks, Pasadena, California, USA, October 2008.

Fitzgerald, M. P., Kalas, P. G., Graham, J. R., Duchêne, G., Pinte, C. “High-Resolution Imaging and Modeling of Circumstellar Debris: Architectures of Planetary Systems,” 207th Meeting of the American Astronomical Society, Seattle, Washington, USA, January 2007.

Fitzgerald, M. P., Kalas, P. G., Duchêne, G., Pinte, C., Graham, J. R. “Keck AO and Circumstellar Debris,” Center for Adaptive Optics Fall Retreat, Yosemite, California, USA, November 2006.

Fitzgerald, M. P., Kalas, P. G., Duchêne, G., Pinte, C., Graham, J. R. “The AU Mic Debris Disk: Multiwavelength Imaging and Modeling,” Keck Science Meeting, University of California, Irvine, California, USA, September 2006.

Fitzgerald, M. P., Gates, E., Gavel, D., Palmer, D. “PSF Reconstruction at Lick.” Center for Adaptive Optics Spring Retreat, University of California, Santa Cruz, California, USA, March 2006.

Fitzgerald, M. P., Graham, J. R., Poyneer, L. A. “Experimental Characterization of High Contrast Imaging through Atmospheric Turbulence.” Center for Adaptive Optics Fall Retreat, Lake Arrowhead, California, USA, November 2005.

Fitzgerald, M. P., Graham, J. R., Kalas, P., and Matthews, B.C. “High Resolution Near-Infrared Imaging of the Debris Disk around AU Mic.” 205th Meeting of the American Astronomical Society, San Diego, California, USA, January 2005.

Fitzgerald, M. P., Kalas, P., Graham, J. R. “AO Coronagraphy of a Circumstellar Debris Disk: Multicolor Imaging of AU Microscopii.” Center for Adaptive Optics Fall Retreat, Lake Arrowhead, California, USA, November 2004.

Fitzgerald, M. P. “Astrometry with Adaptive Optics.” Astrometry 2004, Flagstaff, Arizona, USA, October 2004.

Fitzgerald, M. P. “Status of PSF Reconstruction at Lick Observatory.” Workshop on Adaptive Optics Point Spread Function Reconstruction, Victoria, British Columbia, Canada, May 2004.

Fitzgerald, M. P. “PSF Reconstruction at Lick - Introduction and Status Report.” Center for Adaptive Optics Fall Retreat, Yosemite, California, USA, September 2003.

#### COMPUTER SKILLS

- Languages: x86 ASM, DSP5600x ASM, BASIC, FORTRAN, Pascal, C, C++, Unix shell scripting, Tcl/Tk, Perl, Python.
- High-level numerical languages: Mathematica, Matlab, IDL, Numerical Python.
- Large-scale computing: MPI.
- Applications: L<sup>A</sup>T<sub>E</sub>X, common word processing, spreadsheet, database, and presentation software. Revision control systems (CVS, svn, bazaar, git). Optical design tools (e.g. ZEMAX), mechanical design (SolidWorks), and project management software.
- Operating Systems: Unix/Linux, Macintosh, Windows, VxWorks.
- General: Experience in digital circuit design, digital signal processors, real-time controllers, and UNIX system administration.

#### OTHER ACADEMIC AND PROFESSIONAL EXPERIENCE

- Professional Experience**
- *Keck Interferometer Project, Jet Propulsion Laboratory* **February – July, 2000**

Software development for fringe tracker. Under the direction of Drs. Mark Colavita and Gautam Vasisht.

### Caltech Summer Undergraduate Research Fellowships

- *Keck Interferometer Project, Jet Propulsion Laboratory* **June – August, 1999**  
See above.
- *Dept. of Artificial Intelligence, University of Edinburgh, Scotland* **June – August, 1998**  
Designed and implemented communications protocol for autonomous robotic vehicle. Under the direction of Dr. John Hallam.
- *Stephen Quake Laboratory, California Institute of Technology* **June – August, 1997**  
Assisted in design, fabrication, and testing of microfluidic arrays for processing of DNA samples. Under the direction of Professor Stephen Quake.

### Short Courses

- *Center for Adaptive Optics Professional Development Program* **March 2–6, 2007**  
Workshop on facilitating inquiry-based educational activities.
- *Center for Adaptive Optics Professional Development Workshop* **February 5–10, 2006**  
Introduction to facilitation of inquiry-based educational activities.
- *Center for Adaptive Optics Professional Development Workshop* **March 16–21, 2005**  
Introduction to inquiry-based education.
- *Michelson Summer School* **July 25–29, 2005**  
Emphasis on astrometric detection of extrasolar planets.
- *Michelson Summer School* **July 20–23, 2004**  
Emphasis on nulling interferometry and coronagraphy.
- *Center for Adaptive Optics Summer School* **August 9–15, 2003**  
Advanced instrumentation and techniques for adaptive optics.
- *Michelson Summer School* **June 24–28, 2002**  
Fundamentals of long-baseline interferometry with emphasis in the near infrared.
- *SPIE Short Course: High Dynamic Range Coronagraphy* **August 25, 2002**

### Other Pedagogy

- *Center for Adaptive Optics Summer School* **July 31 – August 5, 2016**  
Lecturer, “Measuring AO Performance.”
- *Center for Adaptive Optics Summer School* **August 3–8, 2014**  
Lecturer, “Measuring AO Performance.”
- *Center for Adaptive Optics Summer School* **August 4–9, 2013**  
Lecturer, “Measuring AO Performance.”
- *Center for Adaptive Optics Summer School* **August 5–10, 2012**  
Lecturer, “Measuring AO Performance.”
- *Dunlap Institute Instrumentation Summer School* **July 29–August 3, 2012**  
Laboratory Instructor, “Wavefront Sensing.”
- *UCLA Research Experience for Undergraduates* **Summer, 2011**  
Supervised an undergraduate research student.
- *Center for Adaptive Optics Summer School* **August 7–12, 2011**  
Lecturer, “Measuring AO Performance.”
- *Center for Adaptive Optics Summer School* **August 8–13, 2010**  
Lecturer, “Measuring AO Performance.”
- *Center for Adaptive Optics Summer School* **August 9–14, 2009**  
Director.
- *Center for Adaptive Optics Fall Retreat* **November 6–9, 2008**  
Instructor, Career Development Workshop: Project Management.
- *Center for Adaptive Optics Summer School* **August 4–8, 2008**  
Instructor, Fourier Optics laboratory.

- *Center for Adaptive Optics Summer School* **August 6–10, 2007**  
Instructor, Fourier Optics laboratory.
- *Center for Adaptive Optics Summer School* **August 4–11, 2006**  
Instructor, Fourier Optics laboratory.
- *Center for Adaptive Optics Mainland Internship Program* **Summer, 2006**  
Supervised a community college student.