

Michael P. Fitzgerald

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RESEARCH INTERESTS	Formation and evolution of circumstellar material, particularly extrasolar planets. Indirect and direct techniques for detection of planetary systems. High-contrast imaging of circumstellar debris. Design and construction of astronomical instruments.	
EDUCATION	University of California, Berkeley Ph.D., Astrophysics, 2007 M.A., Astrophysics, 2002 California Institute of Technology B.S., Engineering and Applied Science, 2000	
PROFESSIONAL ACTIVITY HIGHLIGHTS	Lead Organizer, High-Contrast Imaging Session, Center for Adaptive Optics Retreat Co-Principal Investigator, Keck LIGER instrument Co-Lead Organizer, TMT Planetary Systems Imager instrument Co-Lead, Keck Institute for Space Studies Workshop, “Exoplanet Imaging and Characterization: Coherent Differential Imaging and Signal Detection Statistics” Co-Principal Investigator, NIRSPEC Upgrade project Principal Investigator, OSIRIS Imager Upgrade project UCLA Chapter Lead, Institute for Scientist and Engineer Educators 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	2017 2017 – present 2016 – present Aug., Dec. 2016 2015 – present 2013 – present 2013 – present 2013 – 2015 2011 – present 2011 – present
HONORS AND AWARDS	NASA Group Achievement Award, Exoplanet Laser Frequency Comb Team UCLA Dept. of Physics & Astronomy Teaching Award (Astro 3) UCLA Dept. of Physics & Astronomy Teaching Award (Astro 180) UCLA Dept. of Physics & Astronomy Teaching Award (Astro 180) UCLA Dept. of Physics & Astronomy Teaching Award (Astro 283) UCLA Dept. of Physics & Astronomy Teaching Award (Astro 283) 2008–2009 AAAS Newcomb Cleveland Prize Michelson Postdoctoral Fellow	2017 Spring 2017 Winter 2017 Spring 2016 Winter 2016 Winter 2014 2010 September, 2007 – June, 2010
ACADEMIC EXPERIENCE	University of California, Los Angeles <i>Associate Professor</i> July, 2015 – present <i>Assistant Professor</i> July, 2009 – June, 2015 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. <ul style="list-style-type: none">• Astronomy 3 — Nature of the Universe (Spring 2012, Spring 2014, Winter 2015, Spring 2017)	

- Astronomy 283 — Numerical and Statistical Methods in Astronomy (Winter 2012, Winter 2013, Winter 2014, Winter 2016, Winter 2018)
- Astronomy 180 — Astrophysics Laboratory (Winter 2011, Fall 2011, Fall 2012, Fall 2013, Fall 2014, Spring 2016, Winter 2017, Fall 2017)
- 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

Michelson Postdoctoral Fellow

September, 2007 – June, 2010

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

Graduate Student

August, 2000 – August, 2007

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.

Graduate Student Instructor

August – December, 2002

Head graduate student instructor conducting upper-level undergraduate optical astronomy laboratory.

- AY 120 — Optical Astronomy Laboratory (Fall 2002)

Graduate Student Instructor

August, 2000 – May, 2001

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), computational and neural systems, applied mathematics, control of dynamical systems.

PUBLICATIONS

Martin, E. C.,[†] Fitzgerald, M. P., McLean, I. S., Doppmann, G., Kassis, M., Aliado, T., Canfield, J., Johnson, C., Kress, E., Lanclos, K., Magnone, K., Sohn, J. M., Wang, E., and Weiss, J. “An overview of the NIRSPEC upgrade for the Keck II telescope.” *Proceedings of the SPIE*, 10702 (2018): 107020A (12pp).

Delorme, J.-R., Jovanovic, N., Wallace, J. K., Bartos, R. D., Echeverri, D., Bond, C. Z., Cetre, S., Lilley, S., Jacobson, S., Mawet, D., Wizinowich, P. L., and **Fitzgerald, M.** “First version of the fiber injection unit for the Keck Planet Imager and Characterizer.” *Proceedings of the SPIE*, 10703 (2018): 107033B (8pp).

[†]Student under supervision

Guyon, O., Mazin, B., **Fitzgerald, M.**, Mawet, D., Marois, C., Skemer, A., Lozi, J., and Males, J. “Wavefront control architecture and expected performance for the TMT Planetary Systems Imager.” *Proceedings of the SPIE*, 10703 (2018): 107030Z (11pp).

Skemer, A. J., Stelter, D., Mawet, D., **Fitzgerald, M.**, Mazin, B., Guyon, O., Marois, C., Briese-meister, Z., Brandt, T., Chilcote, J., Delorme, J.-R., Jovanovic, N., Lu, J., Millar-Blanchaer, M., Wallace, J., Vasisht, G., Roberts, L. C., and Wang, J. “The planetary systems imager: 2-5 micron channel.” *Proceedings of the SPIE*, 10702 (2018): 10702A5 (7pp).

Esposito, T. M., Duchêne, G., Kalas, P., Rice, M., Choquet, É., Ren, B., Perrin, M. D., Chen, C. H., Arriaga, P.,[†] Chiang, E., Nielsen, E. L., Graham, J. R., Wang, J. J., De Rosa, R. J., Follette, K. B., Ammons, S. M., Ansdell, M., Bailey, V. P., Barman, T., Sebastián Bruzzone, J., Bulger, J., Chilcote, J., Cotten, T., Doyon, R., **Fitzgerald, M. P.**, Goodsell, S. J., Greenbaum, A. Z., Hibon, P., Hung, L.-W., Ingraham, P., Konopacky, Q., Larkin, J. E., Macintosh, B., Maire, J., Marchis, F., Marois, C., Mazoyer, J., Metchev, S., Millar-Blanchaer, M. A., Oppenheimer, R., Palmer, D., Patience, J., Poyneer, L., Pueyo, L., Rajan, A., Rameau, J., Rantakyö, F. T., Ryan, D., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Wallace, J. K., Ward-Duong, K., Wiktorowicz, S. and Wolff, S. “Direct Imaging of the HD 35841 Debris Disk: A Polarized Dust Ring from Gemini Planet Imager and an Outer Halo from HST/STIS.” *Astronomical Journal* 156 (2018): 47 (16pp).

Rodack, A. T., Males, J. R., Guyon, O., Mazin, B. A., **Fitzgerald, M. P.**, and Mawet, D. “Real-time estimation and correction of quasi-static aberrations in ground-based high contrast imaging systems with high frame-rates.” *Proceedings of the SPIE*, 10703 (2018): 107032N (10pp).

Do, T., Ciurlo, A., Witzel, G., Lu, J., Turri, P., **Fitzgerald, M.**, Campbell, R., Lyke, J., and Ghez, A. “Point-spread function reconstruction for integral-field spectrograph data.” *Proceedings of the SPIE*, 10703 (2018): 107030I (9pp).

Ciurlo, A., Do, T., Witzel, G., Lu, J., Lyke, J., **Fitzgerald, M. P.**, Ghez, A., Campbell, R., and Turri, P. “Off-axis PSF reconstruction for integral field spectrograph: instrumental aberrations and application to Keck/OSIRIS data.” *Proceedings of the SPIE*, 10703 (2018): 107031O (9pp).

Kassis, M., Chan, D., Kwok, S., Krasuski, T., Lyke, J. E., Ragland, S., Lilley, S., Cetre, S., Wizinowich, P., Lewis, H. A., Gomez, P. Rizzi, L., Larkin, J. E., Do, T., **Fitzgerald, M. P.**, Skemer, A., Prochaska, J. X., Westfall, K., Mazin, B., Mawet, D., Matthews, K., Martin, C., Howard, A. W., Lu, J. R., and Chun M. R. “Innovations and advances in instrumentation at the W. M. Keck Observatory.” *Proceedings of the SPIE*, 10702 (2018): 1070207 (20pp).

Arriaga, P.,[†] **Fitzgerald, M.**, Johnson, C., Weiss, J., and Lyke, J. E. “Upgrade and characterization of the OSIRIS imager detector.” *Proceedings of the SPIE*, 10702 (2018): 107022U (6pp).

Greenbaum, A. Z., Pueyo, L., Ruffio, J.-B., Wang, J. J., De Rosa, R. J., Aguilar, J., Rameau, J., Barman, T., Marois, C., Marley, M. S., Konopacky, Q., Rajan, A., Macintosh, B., Ansdell, M., Arriaga, P.,[†] Bailey, V. P., Bulger, J., Burrows, A. S., Chilcote, J., Cotten, T., Doyon, R., Duchêne, G., **Fitzgerald, M. P.**, Follette, K. B., Gerard, B., Goodsell, S. J., Graham, J. R., Hibon, P., Hung, L.-W., Ingraham, P., Kalas, P., Larkin, J. E., Maire, J., Marchis, F., Metchev, S., Millar-Blanchaer, M. A., Nielsen, E. L., Norton, A., Oppenheimer, R., Palmer, D., Patience, J., Perrin, M. D., Poyneer, L., Rantakyö, F. T., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Wallace, J. K., Ward-Duong, K., Wiktorowicz, S. and Wolff, S. “GPI Spectra of HR 8799 c, d, and e from 1.5 to 2.4 μm with KLIP Forward Modeling.” *Astronomical Journal*, 155 (2018): 226 (20pp).

Wang, J. J., Perrin, M. D., Savransky, D., Arriaga, P.,[†] Chilcote, J. K., De Rosa, R. J., Millar-

Blanchaer, M. A., Marois, C., Rameau, J., Wolff, S. G., Shapiro, J., Ruffio, J.-B., Maire, J., Marchis, F., Graham, J. R., Macintosh, B., Ammons, S. M., Bailey, V. P., Barman, T. S., Bruzzone, S., Bulger, J., Cotten, T., Doyon, R., Duchêne, G., **Fitzgerald, M. P.**, Follette, K. B., Goodsell, S., Greenbaum, A. Z., Hibon, P., Hung, L.-W., Ingraham, P., Kalas, P., Konopacky, Q. M., Larkin, J. E., Marley, M. S., Metchev, S., Nielsen, E. L., Oppenheimer, R., Palmer, D. W., Patience, J., Poyneer, L. A., Pueyo, L., Rajan, A., Rantakyö, F. T., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Wallace, J. K., Ward-Duong, K., and Wiktorowicz, S. J. “The automated data processing architecture for the Gemini Planet Imager Exoplanet Survey.” *Journal of Astronomical Telescopes, Instruments, and Systems*, 4 (2018): 018002 (14pp).

Nielsen, E. L., De Rosa, R. J., Rameau, J., Wang, J. J., Esposito, T. M., Millar-Blanchaer, M. A., Marois, C., Vigan, A., Ammons, S. M., Artigau, E., Bailey, V. P., Blunt, S., Bulger, J., Chilcote, J., Cotten, T., Doyon, R., Duchêne, G., Fabrycky, D., **Fitzgerald, M. P.**, Follette, K. B., Gerard, B. L., Goodsell, S. J., Graham, J. R., Greenbaum, A. Z., Hibon, P., Hinkley, S., Hung, L.-W., Ingraham, P., Jensen-Clem, R., Kalas, P., Konopacky, Q., Larkin, J. E., Macintosh, B., Maire, J., Marchis, F., Metchev, S., Morzinski, K. M., Murray-Clay, R. A., Oppenheimer, R., Palmer, D., Patience, J., Perrin, M., Poyneer, L., Pueyo, L., Rafikov, R. R., Rajan, A., Rantakyö, 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. “Evidence that the Directly-Imaged Planet HD 131399 Ab is a Background Star.” *Astronomical Journal*, 154 (2017): 218 (26pp).

Millar-Blanchaer, M. A., Esposito, T. M., Stahl, K.,[†] **Fitzgerald, M. P.**, Kalas, P., Perrin, M. D., Macintosh, B., Graham, J. R., and the GPIES Collaboration. “High contrast observations of circumstellar disks with the Gemini Planet Imager’s polarimetry mode” *Proceedings of the SPIE*, 10407 (2017): 104070V (13pp).

Mawet, D., Delorme, J. R., Jovanovic, N., Wallace, J. K., Bartos, R. D., Wizinowich, P. L., **Fitzgerald, M.**, Lilley, S., Ruane, G., Wang, J., Klimovich, N. and Xin, Y. “A fiber injection unit for the Keck Planet Imager and Characterizer.” *Proceedings of the SPIE*, 10400 (2017) 1040029 (6pp).

Rajan, A., Rameau, J., De Rosa, R. J., Marley, M. S., Graham, J. R., Macintosh, B., Marois, C., Morley, C., Patience, J., Pueyo, L., Saumon, D., Ward-Duong, K., Ammons, S. M., Arriaga, P., Bailey, V. P., Barman, T., Bulger, J., Burrows, A. S., Chilcote, J., Cotten, T., Czekala, I., Doyon, R., Duchêne, G., Esposito, T. M., **Fitzgerald, M. P.**, Follette, K. B., Fortney, J. J., Goodsell, S. J., Greenbaum, A. Z., Hibon, P., Hung, L.-W., Ingraham, P., Johnson-Groh, M., Kalas, P., Konopacky, Q., Lafrenière, D., Larkin, J. E., Maire, J., Marchis, F., Metchev, S., Millar-Blanchaer, M. A., Morzinski, K. M., Nielsen, E. L., Oppenheimer, R., Palmer, D., Patel, R. I., Perrin, M., Poyneer, L., Rantakyö, F. T., Ruffio, J.-B., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Vasisht, G., Wallace, J. K., Wang, J. J., Wiktorowicz, S., and Wolff, S. “Characterizing 51 Eri b from 1-5 μm : a partly-cloudy exoplanet.” *Astronomical Journal*, 154 (2017): 10 (20pp).

Ruffio, J.-B., Macintosh, B., Wang, J. J., Pueyo, L., Nielsen, E. L., De Rosa, R. J., Czekala, I., Marley, M. S., Arriaga, P.,[†] 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., Graham, J. R., Greenbaum, A. Z., Hibon, P., Hung, L.-W., Ingraham, P., Kalas, P., Konopacky, Q., Larkin, J. E., Maire, J., Marchis, F., Marois, C., Metchev, S., Millar-Blanchaer, M. A., Morzinski, K. M., Oppenheimer, R., Palmer, D., Patience, J., Perrin, M., Poyneer, L., Rajan, A., Rameau, J., Rantakyö, F. T., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Wallace, J. K., Ward-Duong, K., Wiktorowicz, S., and Wolff, S. “Improving and Assessing Planet Sensitivity of the GPI Exoplanet Survey with a Forward Model Matched Filter.” *Astrophysical Journal*, 842 (2017): 14 (22pp).

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G., Hughes, A. M., Pan, M., Shannon, A., Clampin, M., **Fitzgerald, M. P.**, Graham, J. R., Holland, W. S., Panić, O., and Su, K. Y. L. “Detection of exocometary CO within the 440 Myr-old Fomalhaut belt: a similar CO+CO₂ ice abundance in exocomets and Solar System comets.” *Astrophysical Journal*, 842 (2017): 9 (15pp).

MacGregor, M. A., Matra, L., Kalas, P., Wilner, D. J., Pan, M., Kennedy, G. M., Wyatt, M. C., Duchene, G., Hughes, A. M., Rieke, G. H., Clampin, M., **Fitzgerald, M. P.**, Graham, J. R., Holland, W. S., Panic, O., Shannon, A., and Su, K. “A Complete ALMA Map of the Fomalhaut Debris Disk.” *Astrophysical Journal*, 842 (2017): 8 (11pp).

Follette, K. B., Rameau, J., Dong, R., Pueyo, L., Close, L. M., Duchêne, G., Fung, J., Leonard, C., Macintosh, B., Males, J. R., Marois, C., Millar-Blanchaer, M. A., Morzinski, K. M., Mullen, W., Perrin, M., Spiro, E., Wang, J., Ammons, S. M., Bailey, V. P., Barman, T., Bulger, J., Chilcote, J., Cotten, T., De Rosa, R. J., Doyon, R., **Fitzgerald, M. P.**, Goodsell, S. J., Graham, J. R., Greenbaum, A. Z., Hibon, P., Hung, L.-W., Ingraham, P., Kalas, P., Konopacky, Q., Larkin, J. E., Maire, J., Marchis, F., Metchev, S., Nielsen, E. L., Oppenheimer, R., Palmer, D., Patience, J., Poyneer, L., Rajan, A., Rantakyro, F. T., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Vega, D., Wallace, J. K., Ward-Duong, K., Wiktorowicz, S., and Wolff, S. “Complex Spiral Structure in the HD 100546 Transitional Disk as Revealed by GPI and MagAO.” *Astronomical Journal*, 153 (2017): 264 (15pp).

Rameau, J., Follette, K. B., Pueyo, L., Marois, C., Macintosh, B., Millar-Blanchaer, M., Wang, J. J., Vega, D., Doyon, R., Lafrenière, D., Nielsen, E. L., Bailey, V., Chilcote, J. K., Close, L. M., Esposito, T. M., Males, J. R., Metchev, S., Morzinski, K. M., Ruffio, J.-B., Wolff, S. G., Ammons, S. M., Barman, T. S., Bulger, J., Cotten, T., De Rosa, R. J., Duchêne, G., **Fitzgerald, M. P.**, Goodsell, S., Graham, J. R., Greenbaum, A. Z., Hibon, P., Hung, L.-W., Ingraham, P., Kalas, P., Konopacky, Q., Larkin, J. E., Maire, J., Marchis, F., Oppenheimer, R., Palmer, D., Patience, J., Perrin, M. D., Poyneer, L., Rajan, A., Rantakyro, F. T., Marley, M. S., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Wallace, J. K., Ward-Duong, K., and Wiktorowicz, S. “An Optical/Near-infrared Investigation of HD 100546 b with the Gemini Planet Imager and MagAO.” *Astronomical Journal*, 153 (2017): 244 (9pp).

Johnson-Groh, M., Marois, C., De Rosa, R. J., Nielsen, E. L., Rameau, J., Blunt, S., Vargas, J., Ammons, S. M., Bailey, V. P., Barman, T. S., Bulger, J., Chilcote, J. K., Cotten, T., Doyon, R., Duchêne, G., **Fitzgerald, M. P.**, Follette, K. B., Goodsell, S., Graham, J. R., Greenbaum, A. Z., Hibon, P., Hung, L.-W.,[†] Ingraham, P., Kalas, P., Konopacky, Q. M., Larkin, J. E., Macintosh, B., Maire, J., Marchis, F., Marley, M. S., Metchev, S., Millar-Blanchaer, M. A., Oppenheimer, R., Palmer, D. W., Patience, J., Perrin, M., Poyneer, L. A., Pueyo, L., Rajan, A., Rantakyro, F., Savransky, D., Schneider, A. C., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Vega, D., Wallace, J. K., Wang, J. J., Ward-Duong, K., Wiktorowicz, S. J., and Wolff, S. G. “Integral Field Spectroscopy of the Substellar Companion HD 984 B with the Gemini Planet Imager.” *Astronomical Journal*, 153 (2017): 190 (13pp).

Chilcote, J., Pueyo, L., De Rosa, R. J., Vargas, J., Macintosh, B., Bailey, V. P., Barman, T., Bauman, B., Bruzzone, S., Bulger, J., Burrows, A. S., Cardwell, A., Chen, C. H., Cotten, T., Dillon, D., Doyon, R., Draper, Z. H., Duchêne, G., Dunn, J., Erikson, D., **Fitzgerald, M. P.**, Follette, K. B., Gavel, D., Goodsell, S. J., Graham, J. R., Greenbaum, A. Z., Hartung, M., Hibon, P., Hung, L.-W., Ingraham, P., Kalas, P., Konopacky, Q., Larkin, J. E., Maire, J., Marchis, F., Marley, M. S., Marois, C., Metchev, S., Millar-Blanchaer, M. A., Morzinski, K. M., Nielsen, E. L., Norton, A., Oppenheimer, R., Palmer, D., Patience, J., Perrin, M., Poyneer, L., Rajan, A., Rameau, J., Rantakyro, F. T., Sadakuni, N., Saddlemeyer, L., Savransky, D., Schneider, A. C., Serio, A., Sivaramakrishnan, A., Song, I., Soummer, R., Thomas, S., Wallace, J. K., Wang, J. J., Ward-Duong, K., Wiktorowicz, S., and Wolff, S. “1 to 2.4 Micron Near-IR Spectrum of the Giant Planet β Pictoris b Obtained with the Gemini Planet Imager.” *Astronomical Journal*, 153 (2017): 182

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Do, T., **Fitzgerald, M. P.**, Ammons, S. M., Crossfield, I., Yelda, S., Armstrong, J. D., Severson, S. “A Fourier Optics and Wavefront Sensing Laboratory.” *ASP Conference Series* 436 (2010): 160–170.

Perrin, M. D., Graham, J. R., Larkin, J. E., Wiktorowicz, S., Maire, J., Thibault, S., **Fitzgerald, M. P.**, Doyon, R., Macintosh, B. A., Gavel, D. T., Oppenheimer, B. R., Palmer, D. W., Saddlemyer, L., Wallace, J. K. “Imaging Polarimetry with the Gemini Planet Imager.” *Proceedings of the SPIE*, 7736 (2010): 192–200.

Adkins, S. M., Bell, J., Conrad, A., **Fitzgerald, M. P.**, Kupke, R., Larkin, J. E., Laiterman, L., Lyke, J., Max, C., McGrath, E., Pollard, M., Panteleev, S., Thomas, S., Wizinowich, P. “DAVINCI: A high-performance imager and integral field spectrograph for the W. M. Keck Observatory’s next-generation adaptive optics facility.” *Proceedings of the SPIE*, 7735 (2010): 253–264.

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

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Kalas, P., Graham, J. R., Chiang, E., **Fitzgerald, M. P.**, Clampin, M., Kite, E. S., Stapelfeldt, K., Marois, C., Krist, J. “Optical Images of an Exosolar Planet 25 Light-Years from Earth,” *Science* 322 (2008): 1345–1348.

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Kalas, P., Duchêne, G., **Fitzgerald, M. P.**, Graham, J. R. “Discovery of an Extended Debris Disk Around the F2V Star HD 15745,” *Astrophysical Journal* 671 (2007): L161–164.

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Fitzgerald, M. P., Kalas, P. G., Duchêne, G., Pinte, C., Graham, J. R. “The AU Mic Debris Disk: Multiwavelength Imaging and Modeling,” *Astrophysical Journal* 670 (2007): 536–556.

Kalas, P., **Fitzgerald, M. P.**, Graham, J. R. “Discovery of Extreme Asymmetry in the Debris Disk Surrounding HD 15115,” *Astrophysical Journal* 661 (2007): L85–88.

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. “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 β 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^AT_EX, common word processing, spreadsheet, database, and presentation software. Revision control systems (CVS, svn, bzt, 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.