Curriculum Vitae

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Education: Ph.D., Astronomy, Yale University, 1994
M.Phil., Astronomy, Yale University, 1989
M.S., Astronomy, Yale University, 1988
B.A., Physics, New College of USF, 1987

Ph.D. Dissertation: Title: An Observational Study of Galaxies and their Environment on Large Scales
Advisor: Augustus Oemler, Jr.

Employment:

2007 – present:	Applications Physicist II, Experimental Astrophysics Group, Fermi National Accelerator Laboratory
1996 – 2007:	Applications Physicist I, Experimental Astrophysics Group, Fermi National Accelerator Laboratory
1994 – 1996:	Postdoctoral Researcher, Astrophysikalisches Institut Potsdam (Germany)
1987 – 1994:	Research Assistant, Yale University
1988 – 1993:	Teaching Assistant, Yale University
1987:	Research Assistant, New College of USF

Experiments: Las Campanas Redshift Survey (LCRS) team member
Sloan Digital Sky Survey (SDSS) I & II Member and Builder
SuperNova Acceleration Probe (SNAP) team member
Blanco Cosmology Survey (BCS) team member
Dark Energy Survey (DES) Member and Builder

Research Interests: Photometric Calibration of Large Surveys,
Strong Gravitational Lensing, Groups of Galaxies,
Star Cluster Photometry

Software Environments: Python, Java, Tcl/Astrotools (SDSS), Fortran, mySQL, IRAF,
Virtual Observatory tools, UNIX/Linux, Mac OSX, VAX VMS

Societies & Organizations American Astronomical Society Member
Astronomical Society of the Pacific Member

References

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Leadership and Management Activities

Current (in rough descending order of time commitment):

1. DES Calibrations Scientist:[1] 2007–present.
2. Organizer of DES PreCam Survey[2] observing and data processing: 2010–present.
3. Co-leader of 8 O'Clock Arc Follow-up Project (SDSS Project #356), 2006–present.
4. Co-chair of the Local Organizing Committee and member of the Scientific Organizing Committee for the conference, "Calibration & Standardization of Large Surveys & Missions in Astronomy & Astrophysics," which was held at Fermilab, April 16-19, 2012.
5. Secretary for DES Management Committee Telecons: 2007–present.

Completed (in rough descending order of time commitment):

1. SDSS `MTPIPE` Coordinator: 1997–2009.
2. Co-leader of SEGUE Open Cluster Project (SDSS Project #287), 2005–2008.
3. Leader of Stripe 82 Tertiary Standards Project (SDSS Project #290), 2005–2007.
4. Co-Chair of the Organizing Committee for the workshop, "Searching for Strong Lenses in Large Imaging Surveys," held at Fermilab, June 14–15, 2007.
5. Chair of the Organizing Committee for the Fall 2007 SDSS Collaboration Meeting, held at Fermilab, November 1–4, 2007.
6. Chair of the Fermilab Center for Particle Astrophysics (FCPA) Visitors' Committee: 2008–2009.
7. Fermilab Representative on the SDSS Collaboration Council: 2005–2008.
8. Secretary for the DES Working Group Meetings: 2006–2007.
9. Secretary for the Fermilab SNAP/DES group meetings 2006–2007.
10. Organizer of the SNAP Calibration Working Group meeting held at Fermilab, July 8-9, 2004.
11. Organizer of the DES RASICAM review held at Fermilab, March 24, 2010.

[1] This position is part of the DES Project Office.

[2] The PreCam Survey is a bright imaging survey in the DES footprint using DES CCDs and 100mm x 100mm DES filters on a 0.6-m telescope at CTIO in order to establish a rigid grid of calibration stars for DES. Observations for the 100-night first season of PreCam occurred between August 2010 and January 2011. A second season is currently under discussion.

Technical Activities

SDSS Photometric Calibration Reductions (1996–2008)

1. Built, maintained, and oversaw the running of the the "PT Factory", the (mostly) automated framework that processed and calibrated data from the Photometric Telescope (2002–2008).

2. Maintained and upgraded the SDSS small-telescope data processing pipeline, `MTIPIPE` and related software products (Tucker, Kent, Richmond, et al. 2006) (1997–2008).

3. Helped in the implementation of the original SDSS Data Release 1 Data Archive Server (DAS) imaging and spectroscopic web query tools (2002-2003).

4. Provided the software support for calibrating the SDSS $u'g'r'i'z'$ standard star network (Smith, Tucker, Kent, et al. 2002) (1997–2002).[3]

5. Worked on the commissioning of and early observing with the replacement to the Monitor Telescope, the SDSS 0.5-m Photometric Telescope ("PT") (1999).

6. Worked on the commissioning of and the observing with the original SDSS 0.6-m Monitor Telescope ("MT") (1996–1998).

SNAP Calibration & Simulations (2002–2008)

1. Acted as a liaison between the SNAP Calibrations Group and the SNAP Simulations Group (2004–2007).

2. Prepared a chapter on the SNAP Calibration Pipeline for the SNAP Calibration Volume (2004–2006).

3. Co-developed a template photometric calibration plan for SNAP to serve as a basis for code development for modeling the effects of calibration errors on the the perceived filter response functions (2004).

4. Co-wrote an Exposure Time Calculator to investigate different options (ground-based, airborne, and space-based missions) for obtaining and calibrating a set of optical/near-infrared spectrophotometric standard stars for the SNAP mission (2004).

5. Wrote code within the SNAP simulations framework that, during each night's "build" of the framework, created an updated webpage containing the current values for the SNAP filter and detector characteristics (2004).

6. Prepared observing proposals, observed candidate SNAP photometric standard stars with the Apache Point Observatory ARC-3.5m telescope, and processed and analyzed the results (2002–2004).

[3] With 985 citations, the Smith, Tucker, Kent, et al. (2002) article is the 11th most cited of all 4368 SDSS-related refereed journal articles published as of late-April 2012.

Technical Activities (cont'd)

DES Calibrations & Pipeline Development (2004–present)

1. Developed a photometric calibration strategy for the DES (Tucker et al. 2006) (2005–present).
2. Co-wrote a pipeline (mostly in python) to process and analyze the data from the PreCam Survey (2010–present).
3. Co-wrote the PreCam Survey observing proposal, organized the PreCam Survey observing runs, helped provide technical support for PreCam observers, and observed for 32 nights of the PreCam Survey (2010-2011).
4. Wrote a suite of Java code for creating catalog-based simulations of stars within the DES and PreCam Surveys for optimizing the photometric calibrations strategy of the DES (2009–2010).
5. Prepared a functional requirements document for the DES 10-micron all-sky camera (RASICAM) (2006).
6. Wrote and maintained the Global Calibrations Module – a software module for calculating zeropoint offsets for overlapping DECam observations – for the DES Data Management (DESDM) data processing pipeline (important upgrades to this module are still in progress) (2006–present).
7. Wrote and maintained the Photometric Standards Module – a code module for enabling the automated analysis of DES standard star observations to produce a photometric solution for a night – for the DESDM) data processing pipeline (2005–present).

Mentoring Activities

1. Cristin Rider (Undergraduate Student)
   - Internship for Physics Majors (IPM) program (Summer 2002), off-site on-call laboratory technician (Academic Year 2002/2003), and Summer intern (Summer 2003)
   - Project: Study of star clusters in the SDSS $u'g'r'i'z'$ filter system.
   - Publication: Rider et al. 2004, "A Survey of Open Clusters in the $u'g'r'i'z'$ Filter System. I. Results for NGC 2548 (M48)," *Astronomical Journal*, 127, 2210
2. David Moore (Undergraduate Student)
   - Internship for Physics Majors (IPM) program (Summer 2004)
   - Project: Study of star clusters in the SDSS $u'g'r'i'z'$ filter system.
3. Bartosz Fornal (Undergraduate Student)
   - Internship for Physics Majors (IPM) program (Summer 2006)
   - Project: Study of star clusters in the SDSS $u'g'r'i'z'$ filter system.
   - Publication: Fornal et al. 2007, "A Survey of Open Clusters in the $u'g'r'i'z'$ Filter System. III. Results for the Cluster NGC 188," *Astronomical Journal*, 133, 1409
4. Martin Schaffer (High School Physics Teacher)
   - DOE Academies Creating Teacher Scientists (ACTS) program (Summer 2009)
   - Project: Processing DECam 2k x 2k CCD imaging data from a CTIO-1m telescope observing run.
5. Holly Batchelor (Undergraduate Student)
   - Internship for Physics Majors (IPM) program (Summer 2010)
   - Project: Processing DECam 2k x 2k CCD imaging data from a CTIO-1m telescope observing run, and preparing real-time tools for the DES PreCam Survey.
6. Deokguen (Daniel) Park (High School Student)
   - Illinois Mathematics & Science Academy (IMSA) program, Academic Years 2010/2011 and 2011/2012.
   - Project 1: Processing DECam 2k x 2k CCD imaging data from a CTIO-1m telescope observing run.
   - Project 2: Study of the globular cluster NGC 1851 in the DES filter system from DES PreCam Survey data.
   - Publication: Park 2012, "Calibration of CCD Images Using Astronomical Standard Stars," *Journal of Experimental Secondary Science*, submitted
7. H. Hope Head (Undergraduate Student)
   - Computing Division internship (Summer 2011)
   - Astrometric calibration of DES PreCam Survey data.

Grants

1. Co-PI on NSF Grant AST-0098401, "Southern Standard Stars for the $u'g'r'i'z'$ Filter System," (PI: J. Allyn Smith; award: $233,000)

2. Co-I on Hubble Space Telescope Cycle 16 Proposal GO-11167, "A Unique High Resolution Window to Two Strongly Lensed Lyman Break Galaxies," (PI: Sahar Allam; award: $133,612)

3. Co-I on Hubble Space Telescope Cycle 16-Supplemental Proposal GO-11974, "High-Resolution Imaging for 9 Very Bright, Spectroscopically Confirmed, Group-Scale Lenses," (PI: Sahar Allam; award: $419,851)

4. Co-I on Hubble Space Telescope Cycle 17 Proposal GO-11602, "High-Resolution Imaging of Three New UV-Bright Lensed Arcs," (PI: Sahar Allam; award: $150,485)

5. Co-I on Sptizer Space Telescope Cycle 4 Proposal 40430, "Spitzer Observations of the Brightest Lensed LBGs," (PI: Sahar Allam; award: $75,215)

6. Co-I on Sptizer Space Telescope Cycle 5 Proposal 50086, "Doubling the Sample of Bright Lensed LBGs Observed by Spitzer," (PI: Sahar Allam; award: $381,631)

Bibliography

Refereed Publications

1. Kazaks P.A., **Tucker D.L.** 1988, "Geometry of Spin Effects in Proton-Proton Scattering," *Physical Review D*, 37, 222

2. Doroshkevich A.G., **Tucker D.L.**, Oemler A., Kirshner R.P., Lin H., Shectman S.A., Landy S.D., Fong R. 1996, "Large- and Superlarge-Scale Structure in the Las Campanas Redshift Survey," *The Monthly Notices of the Royal Astronomical Society*, 283, 1281

3. Hamuy M, Phillips M.M., Suntzeff N.B, et al. 1996, "BVRI Light Curves for 29 Type Ia Supernovae," *The Astronomical Journal*, 112, 2408

4. Landy S.D., Shectman S.A., Lin H., Kirshner R.P., Oemler A., **Tucker D.** 1996, "The 2-Dimensional Power Spectrum of the Las Campanas Redshift Survey: Detection of Excess Power on 100 h^{-1} Mpc Scales," *The Astrophysical Journal (Letters)*, 456, L1

5. Lin H., Kirshner R.P., Shectman S.A., Landy S.D., Oemler A., **Tucker D.L.**, Schechter P.L. 1996, "The Luminosity Function of Galaxies in the Las Campanas Redshift Survey," *The Astrophysical Journal*, 464, 60

6. Lin H., Kirshner R.P., Shectman S.A., Landy S.D., Oemler A., **Tucker D.L.**, Schechter P.L. 1996, "The Power Spectrum of Galaxy Clustering in the Las Campanas Redshift Survey," *The Astrophysical Journal*, 471, 617

7. Shectman S.A., Landy S.D., Oemler A., **Tucker D.L.**, Lin H., Kirshner R.P., Schechter P.L. 1996, "The Las Campanas Redshift Survey," *The Astrophysical Journal*, 470, 172

8. Zabludoff A.I., Zaritsky D., Lin H., **Tucker D.**, Hashimoto Y., Shectman S.A., Oemler A., Kirshner R.P. 1996, "The Environment of 'E+A' Galaxies," *The Astrophysical Journal*, 466, 104

9. Einasto J., Einasto M., Gottlöber S., Müller V., Saar V., Starobinsky A.A., Tago E., **Tucker D.**, Andernach H., Frisch P. 1997, "A 120 Mpc Periodicity in the Three-Dimensional Distribution of Galaxy Superclusters," *Nature*, 385, 139

10. Einasto J., Einasto M., Frisch P., Gottlöber S., Müller V., Saar V., Starobinsky A.A., Tago E., **Tucker D.**, Andernach H. 1997, "The Supercluster-Void Network II: An Oscillating Cluster Correlation Function," *The Monthly Notices of the Royal Astronomical Society*, 289, 801

11. Einasto J., Einasto M., Frisch P., Gottlöber S., Müller V., Saar V., Starobinsky A.A., **Tucker D.** 1997, "The Supercluster-Void Network III: The Correlation Function as a Geometrical Statistic," *The Monthly Notices of the Royal Astronomical Society*, 289, 813

12. **Tucker D.L.**, Hasinger G., Lin H. 1997, "ROSAT Public PSPC Observations in the Las Campanas Redshift Survey," *Astronomische Nachrichten*, 318, 141

13. **Tucker D.L.**, Oemler A., Kirshner R.P., Lin H., Shectman S.A., Landy S.D., Schechter P.L., Müller V., Gottlöber S., Einasto J. 1997, "The Las Campanas Redshift Survey Galaxy-Galaxy Autocorrelation Function," *The Monthly Notices of the Royal Astronomical Society*, 285, 5P

14. Hashimoto Y., Oemler A., Lin H., **Tucker D.L.** 1998, "The Influence of Environment on the Star Formation Rates of Galaxies," *The Astrophysical Journal*, 499, 589

15. Allam S.S., **Tucker D.L.**, Lin H., Hashimoto Y. 1999, "Star Formation in Las Campanas Compact Groups," *The Astrophysical Journal (Letters)*, 522, L92

16. Einasto J., Einasto M., Tago E., Starobinksy A.A., Atrio-Barandela F., Müller V., Knebe A., Frisch P., Cen R., Andernach H., **Tucker D.** 1999, "Steps Toward the Power Spectrum of Matter I: The Mean Spectrum of Galaxies," *The Astrophysical Journal*, 519, 441

17. Fan X., Strauss M.A., Schneider D.P., et al. 1999, "High-Redshift Quasars Found in Sloan Digital Sky Survey Commissioning Data," *The Astronomical Journal*, 118, 1

18. Strauss M.A., Fan X., Gunn J.E., et al. 1999, "The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data," *The Astrophysical Journal*, 522, 61

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20. Allam S., **Tucker D.** 2000, "Compact Groups of Galaxies in the Las Campanas Redshift Survey," *Astronomische Nachrichten*, 321, 101

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28. Blanton M., Dalcanton J., Eisenstein D., et al. 2001, "The Luminosity Function of Galaxies in the SDSS Commissioning Data," *The Astronomical Journal*, 121, 2358

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30. Eisenstein D., Annis J., Gunn J. E., et al. 2001, "Spectroscopic Target Selection for the Sloan Digital Sky Survey: The Luminous Red Galaxy Sample," *The Astronomical Journal*, 122, 2267

31. Lee B. C., **Tucker D. L.**, Vanden Berk D. E., et al. 2001, "Sloan Digital Sky Survey Multicolor Observations of GRB 010222," *The Astrophysical Journal*, 561, 183

32. Smith J.A., **Tucker D.L.**, Kent S., et al. 2002, "The Sloan Digital Sky Survey: The $u'g'r'i'z'$ Standard Star System," *The Astronomical Journal*, 123, 2121

33. Stoughton C., Lupton R. H., Bernardi M., et al. 2002, "Sloan Digital Sky Survey: Early Data Release," *The Astronomical Journal*, 123, 485

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46. Einasto M., Jaaniste J., Einasto J., Heinämäki P., Müller V., **Tucker D. L.** 2003, "Las Campanas Loose Groups in the supercluster-void network," *Astronomy & Astrophysics*, 405, 821

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51. Ivezić Ž., Lupton R. H., Schlegel D., et al. 2004, "SDSS data management and photometric quality assessment," *Astronomische Nachrichten*, 325, 583

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54. Allam S. S., **Tucker D. L.**, Smith J. A., Lee B. C., Annis J., Lin H., Karachentsev I. D., Laubscher B. E. 2004, "Merging Galaxies in the Sloan Digital Sky Survey Early Data Release," *The Astronomical Journal*, 127, 1883

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72. Allam S. S., **Tucker D. L.**, Lin H., Diehl H. T., Annis J., Buckley-Geer E. J., Frieman J. A. 2007, "The 8 O'Clock Arc: A Serendipitous Discovery of a Strongly Lensed Lyman Break Galaxy in the SDSS DR4 Imaging Data, *The Astrophysical Journal (Letters)*, 662, L51

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