Carl Andrew Ziegler
Assistant Professor/Observatory Director

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Research Interests

Characterization of exoplanets; formation and evolution of planetary systems in multiple star systems; large adaptive optics surveys; detection of long-period transiting planets

Positions

September 2020 - current	**Stephen F. Austin State University**, Nacogdoches, TX
	Assistant Professor of Astronomy
	Director of SFA Observatory
August 2018 - July 2020	**University of Toronto**, Toronto, ON
	Dunlap Postdoctoral Fellow
	PI: SOAR TESS survey (speckle imaging survey)
	PI: One Hit Wonders (TESS single-transit planet survey)

Education

May 2018	**University of North Carolina**, Chapel Hill, NC
	PhD, Physics and Astronomy
	Thesis: "Characterization of Exoplanets and Stellar Systems with New Robots"
	Advisor: Prof. Nicholas Law
August 2013	**Southern Illinois University**, Carbondale, IL
	M.S., Physics
	Thesis: "Adsorption of Neon on Open Carbon Nanohorn Aggregates"
	Advisor: Prof. Aldo Migone
May 2009	**William Jewell College**, Liberty, MO
	B.A., Physics and Mathematics
	Research: variable stars, globular clusters
	Advisor: Prof. Maggie Sherer

First or Second Author Publications

8. *SOAR TESS Survey. II: The planetary desert in close binary systems*
C. Ziegler, et al., *In prep.*

7. *SOAR TESS Survey. I: Sculpting of TESS planetary systems by stellar companions*
C. Ziegler, et al., The Astronomical Journal, 2020 **159** 19

6. *Measuring the Recoverability of Close Binaries in Gaia DR2 with the Robo-AO Kepler Survey*
C. Ziegler, et al., The Astronomical Journal, 2018 **156** 259

5. *Robo-AO Kepler Planetary Candidate Survey V: The effect of physically associated stellar companions on planetary systems*
C. Ziegler, et al., The Astronomical Journal, 2018 **156** 83

First or Second Author Publications – Continued

4. *Robo-AO Kepler Planetary Candidate Survey IV: The effect of nearby stars on 3857 planetary candidate systems*
    C. Ziegler, et al., The Astronomical Journal, 2018 **155** 161

3. *Robo-AO Kepler Planetary Candidate Survey III: Adaptive Optics Imaging of 1629 Kepler Exoplanet Candidate Host Stars*
    C. Ziegler, et al., The Astronomical Journal, 2017 **153** 66

2. *Robo-AO Kepler Planetary Candidate Survey II: Adaptive Optics Imaging of 969 Kepler Exoplanet Candidate Host Stars*
    C. Baranec, C. Ziegler, et al., The Astronomical Journal, 2016 **152** 18

1. *Multiplicity of the Galactic Senior Citizens: A High-resolution Search for Cool Subdwarf Companions*
    C. Ziegler, et al., The Astrophysical Journal, 2015 **804** 30

Other Refereed Publications

44. *Two young planetary systems around field stars with ages between 20 – 220 Myr from TESS*
    G. Zhou, ..., C. Ziegler, et al., *In submission*

43. *TOI 694b and TIC220568520b: Two low-mass companions near the hydrogen burning mass limit orbiting sun-like stars*
    I. Mireles, ..., C. Ziegler, et al., *In submission*

42. *TOI 540 b: A Terrestrial Planet Smaller than Earth Orbiting a Nearby Rapidly Rotating Low-mass Star*
    K. Ment, ..., C. Ziegler, et al., *In submission*

41. *The CARMENES search for exoplanets around M dwarfs. Two planets on the opposite sides of the radius gap transiting the nearby M dwarf LP 729-54*
    G. Nowak, ..., C. Ziegler, et al., *In submission*, arXiv:2003.01140

40. *Three Short Period Jupiters from TESS*
    L. Neilsen, ..., C. Ziegler, et al., *Accepted to A&A*, arXiv:2003.05932

39. *TESS reveals a short-period sub-Neptune sibling (HD 86226 c) to a known long-period giant planet*
    J. Teske, ..., C. Ziegler, et al., *Accepted to AJ*

38. *KELT-25b and KELT-26b: A Hot Jupiter and a Substellar Companion Transiting Young A-stars Observed by TESS*
    R. Rodriguez, ..., C. Ziegler, et al., *Accepted to AJ*, arXiv:1912.01017

37. *TESS discovery of a super-Earth and three sub-Neptunes hosted by the bright, Sun-like star HD 108236*
    T. Daylan, ..., C. Ziegler, et al., *In submission*, arXiv:2004.11314

36. *TOI-257b (HD 19916b): A Warm sub-Saturn on a Moderately Eccentric Orbit Around an Evolved F-type Star*
    B. Addison, ..., C. Ziegler, et al., *In submission*, arXiv:2001.07345

35. *Two intermediate-mass transiting brown dwarfs from the TESS mission*
    T. Carmichael, ..., C. Ziegler, et al., *Accepted to AJ*, arXiv:2002.01943

34. *A pair of TESS planets spanning the radius valley around the nearby mid-M dwarf LTT 3780*
    R. Cloutier, ..., C. Ziegler, et al., The Astronomical Journal, **160** 3

33. *TESS Hunt for Young and Maturing Exoplanets (THYME) II: A 17 Myr Old Transiting Hot Jupiter in the Sco-Cen Association*
    A. Rizzuto, ..., C. Ziegler, et al., *In submission*, arXiv:2005.00013

32. *The First Habitable Zone Earth-sized Planet from TESS. I: Validation of the TOI-700 System*
    E. Gilbert, ..., C. Ziegler, et al., *In submission*, arXiv:2001.00952

Other Publications - Continued

31. *TOI-954 b and EPIC 246193072 b: Short-Period Saturn-Mass Planets that Test Whether Irradiation Leads to Inflation*
    L. Shao, ..., C. Ziegler, et al., *In submission*

30. *TIC 278956474: Two close binaries in one system, identified by TESS*
    P. Rowden, ..., C. Ziegler, et al., *Accepted to Astronomical Journal*, arXiv:2006.08979

29. *LHS 1815b: The First Thick-Disk Planet Detected By TESS*
    T. Gan, ..., C. Ziegler, et al., The Astronomical Journal, 2020 **159** 160

28. *A hot terrestrial planet orbiting the bright M dwarf L 168-9 unveiled by TESS*
    N. Astudillo-Defru, ..., C. Ziegler, et al., Astronomy & Astrophysics, 2020 **636** 58

27. *TOI-677 b: A Warm Jupiter (P=11.2d) on an eccentric orbit around a late F-type star*
    A. Jordán, ..., C. Ziegler, et al., The Astronomical Journal, 2020 **159** 145

26. *TIC 260128333: TESS' First Transiting Circumbinary Planet*
    V. Kostov, ..., C. Ziegler, et al., The Astronomical Journal, 2020 **159** 253

25. *TOI-222: a single-transit event TESS candidate revealed to be a 34-day eclipsing binary with CORALIE, EulerCam and NGTS*
    M. Lendl, ..., C. Ziegler, et al., MNRAS, 2020 **492** 1761

24. *TESS discovers a remnant planetary core in the hot Neptunian desert*
    D. Armstrong, ..., C. Ziegler, et al., *Accepted to Nature*, arXiv:2003.10314

23. *TOI-132 b: A short-period desert Neptune orbiting a V$\sim$11 G star delivered by TESS*
    M. Diaz, ..., C. Ziegler, et al., MNRAS, 2020 **493** 973

22. *TOI 564 b and TOI 905 b: Grazing and Fully Transiting Hot Jupiters Discovered by TESS*
    A. Davis, ..., C. Ziegler, et al., *In submission*, arXiv:1912.10186

21. *An Ultra-Hot Neptune in the Neptune desert*
    J. Jenkins, ..., C. Ziegler, et al., *Accepted to Nature Astronomy*

20. *Planet Hunters TESS I: TOI 813, a subgiant hosting a transiting Saturn-sized planet on an 84-day orbit*
    N. Eisner, ..., C. Ziegler, et al., MNRAS, 2020 **494** 750

19. *Robo-AO M dwarf Multiplicity Survey: Catalog*
    C. Lamman, ..., C. Ziegler, et al., The Astronomical Journal, 2020 **159** 139

18. *Investigating the origin of the spectral line profiles of the Hot Wolf-Rayet Star WR2*
    A.-N. Chené, ..., C. Ziegler, et al., MNRAS, 2019 **5834** 484

17. *TESS Spots a Compact System of Super-Earths around the Naked-Eye Star HR 858*
    A. Vanderburg, ..., C. Ziegler, et al., ApJL, 2019 **881** 19

16. *HD 213885b: A transiting 1-day-period super-Earth with an Earth-like composition around a bright (V=7.9) star unveiled by TESS*
    N. Espinoza, ..., C. Ziegler, et al., MNRAS, 2020 **491** 2

15. *An Eccentric Massive Jupiter Orbiting a Sub-Giant on a 9.5 Day Period Discovered in the Transiting Exoplanet Survey Satellite Full Frame Images*
    J. E. Rodriguez, ..., C. Ziegler, et al., The Astronomical Journal, 2019 **157** 5

14. *Near-resonance in a system of sub-Neptunes from TESS*
    S. N. Quinn, ..., C. Ziegler, et al., *Astronomical Journal, 2019* **158** *5*

Other Publications - Continued

13. *HD2685 b: A Hot-Jupiter orbiting an early F-type star detected by TESS*
    M I. Jones, ..., C. Ziegler, et al., Astronomy & Astrophysics, 2019 **625** 16

12. *The Elusive Majority of Young Moving Groups*
    B. Bowler, S. Hinkley, C. Ziegler, et al., The Astrophysical Journal, 2019, **877** 60

11. *Full Sky Coverage Laser-only Adaptive Optics Achieves Significant Image Quality Gains Compared to Seeing-limited Observations*
    W. Howard, N. Law, C. Ziegler, et al., The Astronomical Journal, 2018 **155** 59

10. *Robo-AO Discovery and Basic Characterization of Wide Multiple Star Systems in the Pleiades, Praesepe, and NGC 2264 Clusters*
    L. Hillenbrand, ..., C. Ziegler, et al., The Astronomical Journal, 2018 **155** 51

9. *Robo-AO Kepler Asteroseismic Survey. I. Adaptive optics imaging of 99 asteroseismic Kepler dwarfs and subgiants*
   J. Schonhut-Stasik, C. Baranec, ..., C. Ziegler, et al., Astrophysical Journal, 2017 **847** 97

8. *Ultra Short Period Planets in K2 with companions: a double transiting system for EPIC 220674823*
   E. R. Adams, ..., C. Ziegler, et al., The Astronomical Journal, 2017 **153** 82

7. *197 Candidates and 104 Validated Planets in K2's First Five Fields*
   I. Crossfield, ..., C. Ziegler, et al., The Astrophysical Journal Supplement, 2016 **226** 7

6. *Probability of physical association of 104 blended companions to Kepler objects of interest using visible and near-infrared adaptive optics photometry*
   D. Atkinson, C. Baranec, C. Ziegler, et al., The Astronomical Journal, 2017 **153** 25

5. *Two Small Temperate Planets Transiting Nearby M Dwarfs in K2 Campaigns 0 and 1*
   J. Schlieder, ..., C. Ziegler, et al., The Astrophysical Journal, 2016 **818** 87

4. *HII 2407: An Eclipsing Binary Revealed By K2 Observations of the Pleiades*
   T. David, ..., C. Ziegler, et al., The Astrophysical Journal, 2015 **814** 62

3. *KELT-8b: A Highly Inflated Transiting Hot Jupiter and a New Technique for Extracting High-precision Radial Velocities from Noisy Spectra*
   B. Fulton, ..., C. Ziegler, et al., The Astrophysical Journal, 2015 **810** 30

2. *Robotic Laser Adaptive Optics Imaging of 715 Kepler Exoplanet Candidates with Robo-AO*
   N. Law, ..., C. Ziegler, et al., The Astrophysical Journal, 2014 **791** 35

1. *Neon and CO_2 Adsorption on Open Carbon Nanohorns*
   V. Krungleviciute, C. Ziegler, et al., Langmuir, 2013 **29** (30), 9388–9397

SPIE Instrumentation Papers

3. *SRAO: the southern robotic speckle + adaptive optics system*
   N. Law, C. Ziegler, A. Tokovinin, Proc. SPIE 9907, Optical and Infrared Interferometry and Imaging V, 99070K, 2016

2. *SRAO: optical design and the dual-knife-edge WFS*
   C. Ziegler, et al., Proc. SPIE 9909, Adaptive Optics Systems V, 99093Z, 2016

1. *The Robo-AO KOI survey: laser adaptive optics imaging of every Kepler exoplanet candidate*
   C. Ziegler, et al., Proc. SPIE 9909, Adaptive Optics Systems V, 99095U, 2016

Talks

Conference Talks

- *SOAR TESS survey: The sculpting of planetary systems by stellar companions*
  AAS 235, January 5-9, Honolulu, HI (2020)

- *One Hit Wonders: Hunting the longest-period TESS planets*
  TESS Sci Con I, July 29-Aug 2, Cambridge, MA (2019)

- *One Hit Wonders: Hunting the longest-period TESS planets*
  CASCA 2019, June 17-20, Montreal, QC (2019)

- *Death Stars? Understanding how tight binaries impact TESS planets with SOAR speckle imaging*
  AAS 233, January 6-10, Seattle, WA (2019)

- *Robo-AO KOI Survey: LGS-AO imaging of every Kepler planetary candidate host star*
  AAS 231, January 9-12, National Harbor, MD (2018)

- *High resolution imaging of 4000 Kepler planetary candidate host stars*
  Know Thy Star, Know Thy Planet, October 11, Pasadena, CA (2017)

- *Robo-AO KOI Survey: LGS-AO imaging of every Kepler planetary candidate host star*
  Transiting Exoplanets, July 17, Keele, UK (2017)

- *Adaptive Optics Imaging of Kepler Planetary Candidates*
  North Carolina Astronomers Meeting, September 24, Jamestown, NC (2016)

- *The Robo-AO KOI Survey: Laser Adaptive Optics Imaging of Every Kepler Exoplanet Candidate*
  AAS 227, January 4-8, Kissimmee, FL (2016)

- *Study of Carbon Dioxide adsorption on Purified HiPco Nanotubes*
  American Physical Society Meeting, March 18–22, Baltimore, MD (2013)

Invited Talks

- *The Robo-AO KOI survey and the development of a Southern robotic AO system*
  Institute for Astronomy, September 14, Hilo, Hawaii (2016)

Conference Posters

- *One Hit Wonders: recovering the longest period TESS planets*
  C. Ziegler, et al., Extreme Solar Systems IV, Reykyavik, Iceland (2019)

- *Sculpting of TESS Planetary Systems by Binary Stars*
  C. Ziegler, et al., Tess SciCon I, Cambridge, MA (2019)

- *Robo-AO KOI Survey: Robotic LGS-AO Imaging of Every Kepler Planetary Candidate*
  C. Ziegler, et al., Kepler SciCon IV, NASA Ames (2017)

- *SRAO: the first southern robotic AO system*
  C. Ziegler, et al., SPIE Astronomical Telescopes + Instrumentation, Edinburgh, UK (2016)

- *The Robo-AO KOI survey: laser adaptive optics imaging of every Kepler exoplanet candidate*
  C. Ziegler, et al., SPIE Astronomical Telescopes + Instrumentation, Edinburgh, UK (2016)

- *Multiplicity of the Galactic Senior Citizens: A high-resolution search for cool subdwarf companions*
  C. Ziegler & N. Law, AAS 225, Seattle, WA (2015)

Teaching Experience

Fall 2019	**University of Toronto**, Toronto, ON *Exoplanet mini-course, AST 221* Taught 8-week course on detection of exoplanets and exoplanet demographics to Astronomy majors. Mix of lectures an in-class group projects.
Summer 2019	**University of Toronto**, Toronto, ON *AO Lab Lead, Dunlap Summer School* Led both undergraduates and graduate students in a lecture introducing adaptive optics and a lab to build a Shack-Hartmann wavefront sensor.
Summer 2019	**University of Toronto**, Toronto, ON *Summer Undergraduate Mentor* Advised summer undergraduate student in testing and implementing robotic telescope control and on-the-fly data reduction pipeline.
Spring 2017	**University of North Carolina**, Chapel Hill, NC *Undergraduate Research Mentor* Advised capstone course for UNC undergraduate to build novel methods to reduce adaptive optics images of bright stars
Summer 2015	**University of North Carolina**, Chapel Hill, NC *Summer Research Mentor* Advised high school student with *Kepler* host star multiplicity research

Teaching Experience - Continued

Fall 2013- Spring 2014	**University of North Carolina**, Chapel Hill, NC *Astronomy 101L Lab Teaching Assistant* Led five lab sections using robotic "Skynet" telescopes
Fall 2010- Spring 2013	**Southern Illinois University**, Carbondale, IL *Astronomy 101 Lab Teaching Assistant* Taught twenty lab sections in astronomy
Spring 2012- Fall 2012	**Southern Illinois University**, Carbondale, IL *Physics Lab Instructor* Taught three calculus-based physics lab courses

Professional Service and Public Outreach

- Referee for MNRAS, ApJ, AJ, PASP, and A&A
- Assisted monthly public observing nights for Chapel Hill Astronomical and Observational Society
- Two public talks for Raleigh Astronomy Club
- Organized and led astronomy booth for UNC Science Expo

Sofware Skills

Computer Programming:	- Python (primary language for astronomical data analysis) - C++ (control software for Andor EMCCD camera, WFS reconstruction) - TheSkyX (automated telescope and observatory control) - MaximDL (camera control and reduction) - Mathematica (hydrodymical simulations for graduate ISM class) - HTML (designed project sites, `roboaokepler.org` and `onehitwonders.space`) - LabVIEW (wrote control GUI for gas adsorption instrumentation) - Mathematica (hydrodymical simulations for graduate ISM class)

Instrumentation

Instrumentation Design:	- Zemax (optical design for Robo-SOAR) - SolidWorks (modeling for fabrication of custom mounts and packaging used in Robo-SOAR)
Robo-SOAR construction:	- built optical testbed of NGS-AO system - designed and constructed prototype of reflective pyramid WFS

References

Professor Suresh Sivanandam
Assistant Professor, Dunlap Institute for Astronomy, University of Toronto
sivanandam@dunlap.utoronto.edu / 416-978-6550

Professor Nicholas Law
Assistant Professor, Department of Astronomy, University of North Carolina
nlaw@unc.edu / 919-962-3019

Professor Christoph Baranec
Assistant Astronomer, Institute for Astronomy, University of Hawaii, Manoa
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Professor Adam Kraus
Assistant Professor, Department of Astronomy, University of Texas, Austin
alk@astro.as.utexas.edu / 617-956-7740