

**Proceedings of the 26th Annual
KECK NORTHEAST
ASTRONOMY CONSORTIUM
Undergraduate Symposium on
Research in Astronomy**



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WILLIAMS COLLEGE
October 16–17, 2015

**Colgate University
Haverford College
Middlebury College
Swarthmore College**

**Vassar College
Wellesley College
Wesleyan University
Williams College**

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Introduction—The Keck Northeast Astronomy Consortium

Astronomers from eight northeast colleges founded the Keck Northeast Astronomy Consortium (KNAC) in 1990 to address the particular problems and special opportunities characteristic of strong astronomy programs at small institutions. Funded by the W.M. Keck Foundation for its first decade, KNAC continues to enjoy a lively cultivation of ideas through subsequent funding by the eight colleges, as well as by the National Science Foundation (NSF REU awards AST-0353997, AST-0647325, and AST-1005024). Our eight campuses form a *Research Experience for Undergraduates* site.

The goals of the consortium are to (1) promote inter-institutional collaboration among the astronomers (and students) in the consortium; (2) update the research and teaching equipment on our campuses to enhance instruction in modern observation, data acquisition, and data processing; (3) develop and share laboratory exercises, curricular strategies, and research programs to enhance astronomy education within the consortium and the larger community; and (4) promote publication-worthy inter-institutional research collaborations between students and faculty, primarily through a summer student exchange.

The initial funding from the Keck Foundation supported a one-time purchase of CCD cameras, spectrographs, and image-processing workstations for our observatories. The current NSF grant provides stipends for 10 student-faculty summer research collaborations. KNAC-supported student fellows from consortium schools always work at a school other than their home. KNAC also supports fellows from other institutions. Every fall, these students present their results to their peers and the consortium faculty at a grant-funded research symposium. The consortium uses other funds to support additional students working (often with KNAC fellows) at their home institutions, as well as a summer faculty meeting to exchange ideas on research and teaching.

The papers in this booklet represent the work presented at the 26th KNAC Undergraduate Symposium held at Williams College on October 16–17, 2015. All students funded by the Consortium contributed to this volume, as did a number of students who worked at their home institutions or at other sites.

Many of our students have used IRAF for processing the data for the projects described here. IRAF is distributed by the National Optical Astronomy Observatories, which is operated by the Association of Universities for Research in Astronomy, Inc. (AURA) under a cooperative agreement with the National Science Foundation.

Table of Contents

Introduction.....	i
Table of Contents.....	iii
Papers:	
Assessing the utility of quantitative morphology measures in galaxy formation simulations	1
Matthew W. Abruzzo, Haverford College	
Tracking Spectral Noise Lines in Advanced LIGO Data	6
Gillian Dora Beltz-Mohrmann, Wellesley College	
KELT: The Search for Extrasolar Planets	11
Derrick Carr, Haverford College; Alejandra Escamilla Saldaña and Elif Samanci, Wellesley College	
A New Selection Criteria for Red and Obscured Quasars in Stripe 82	17
Milena Crnogorčević, Middlebury College, and Henry Daniels-Koch, Bowdoin College	
Searching for Non-Axisymmetry in 49 Ceti’s Unusual Gas-Rich Debris Disk	25
Cail Daley, Wesleyan University	
Spectral Analysis of Magnesium and Iron in the Interstellar Medium	30
Julian Dann, Wesleyan University	
Open Source Planet Hunting with Cloud-Kepler	35
Girish Duvvuri, Wesleyan University	
The Effects of Commercial Airline Traffic on LSST Observing Efficiency	40
Rose Gibson, Wellesley College	
X-ray Analysis of Four Low-Redshift QSOs	44
Carol Hundal, Wellesley College, and Larson Lovdal, Middlebury College	
Historic Optical Light Curve of the Blazar 3C 454.3	51
Leah Jenks and Brian D'Auteuil, Colgate University; Caitlin Rose, Vassar College	
Detecting K2 Campaign 3 Planet Candidates	58
Katie Karnes, Colgate University	
Recovery of Long Period Transiting Exoplanets	63
Arjun Khandelwal, Haverford College	
Constraining the Sidereal Period and Spin Direction of (2144) Marietta	68
Max Kurzner, Colgate University	
Searching for Circumbinary Planets in K2 Data	73
Emma Lewis and Nicole Bañales, Swarthmore College; Marcus Hughes, Williams College	
Photoionization Models of Planetary Nebulae in the Outer Regions of M31	81
Tim Nagle-McNaughton and MeiLu McDermott, Williams College	

Kepler Observations of ASAS Variables	89
Jacklyn M. Pezzato, Swarthmore College	
CO and DCO+ to Constrain Turbulence and Snow Line in HD 163296.....	94
Sanaea Cooper Rose, Wellesley College	
Developing a Methodology to Classify Io's Mountains by Morphology	99
Tina Seeger, Williams College	
The 2014–2015 Optical Outburst of the Blazar 3C 454.3.....	103
Zachary Weaver, Nicholas Didio, and Carolyn Morris, Colgate University	
Short Term Variability in the Open Cluster NGC 1960	110
Hallee Wong, Williams College, and Aylin Garcia Soto, Wesleyan University	
Posters:	
Modeling Absorption Features in the Reflectance Spectra of KH 15D	120
Rachel Aronow and Avi Stein, Wesleyan University	
Precise Measurement of the Stark Shift in the Indium 6P_{1/2} State Using Two-Step Laser Spectroscopy	121
Allison Carter, Williams College	
Observation of the 2015 Occultation of Pluto	122
Becky Durst, Williams College	
Characterization of Near Earth Asteroids (NEAs).....	123
Jennifer Gubner, Wellesley College	
Exploring Extragalactic Emission: The Hα Dot Survey.....	124
Rayna Rampalli, Wellesley College	
It's a Tight Squeeze: Reducing Noise Levels of Quantum Correlated Squeezed Light	125
Anneliese Rilinger, Williams College	
Second Harmonic Generation and Magnetic Contrast versus Laser Intensity for Materials of Interest in Spin Hall Effect Spin Current Generation	126
Sarah Stevenson, Williams College	
Infrared SED Decomposition of Active Galactic Nuclei	127
Emily Stump, Williams College	