

PROMOTION RECOMMENDATION
The University of Michigan
College of Literature, Science, and the Arts

Rebecca A. Bernstein, assistant professor of astronomy, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of astronomy, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	1998	California Institute of Technology
A.B.	1992	Princeton University

Professional Record:

2001 – present	Assistant Professor, Department of Astronomy, University of Michigan
2000 – 2001	Research Fellow, Carnegie Observatories
1997 – 2000	Hubble Fellow, Carnegie Observatories

Summary of Evaluation:

Teaching – Professor Bernstein is a successful instructor at every level of the department curriculum, having found a sensible balance between rigor and accessibility. Her popularity with astronomy majors and graduate students comes in part from her very lucid presentations of material that will help them succeed in their careers. She has made significant contributions to the development of new curricular material and currently supervises three students working on their dissertations.

Research – Professor Bernstein’s research lies in the field of extragalactic astronomy, including the formation, structure, and evolution of galaxies, clusters of galaxies, and the universe as a whole. She specializes in traditional observational astronomy and in the creation of astronomical instrumentation. In the latter category, her major accomplishment has been the Magellan Inamori Kyocera Echelle (MIKE) spectrograph, the most efficient high-resolution astronomical spectrograph ever developed. She has completed measurements of the extragalactic light in clusters and she has begun an ambitious program of measuring the elemental abundances of individual stars in star clusters in nearby galaxies, thereby raising the study of the history of formation of star clusters and their host galaxies to a new level of precision.

Recent and Significant Publications:

“Diffuse optical light in Galaxy Clusters I: Abell 3888,” with J. E. Krick and K. A. Pimblett, *Astrophysical Journal*, 131, 2006, p. 168.

“The formation of dust lanes: Implications for galaxy evolution,” with J. Dalcanton and J. Yoachim, *Astrophysical Journal*, 608, 2004, p. 189.

“The first detections of the extragalactic background light at 300, 550, 800nm: Cosmological implications,” with W. L. Freedman and B. F. Madore, *Astrophysical Journal*, 571, 2002, p. 107.

Service – In addition to the usual duties on curricular, colloquium, and examination committees, Professor Bernstein has performed extraordinarily as chair of a faculty search committee that resulted in two excellent appointments, and as the University representative on the Giant

Magellan Telescope Project Scientists Working Group. She also served on National Science Foundation review panels and on the Dean's Advisory Committee on Gender in the Natural Sciences.

External Reviews:

Reviewer (A)

"Recently Rebecca has undertaken the optical design of two second-generation spectrographs for Magellan... Both are elegant, extremely efficient designs. ... She has the talent to take the lead in instrument development, and will have a good shot at winning successful instrumentation proposals. Because Rebecca both builds and uses her instruments, they are likely to be well thought out, like her current projects."

Reviewer (B)

"Her 'traditional' research ... is characterized by particularly careful and sophisticated analysis. An excellent example is the work she did on the absolute flux of the extra-galactic background light (EBL) at optical wavelengths. ...the trio of Bernstein ApJ [*Astrophysical Journal*] papers on this topic in 2002 still defines the state of the art for this important measurement."

Reviewer (C)

"...she has already attracted several graduate students with Master's and Ph.D. level projects and has provided funding to support them. She has offered a graduate-level course in Modern Astronomical Techniques whose outline makes me wish I could audit the course myself."

Reviewer (D)

"Dr. Bernstein's instrument design work is informed by her experience with challenging problems in astrophysical research where she has had to understand instrument performance at a very detailed level. Her command of optics is very unusual and valuable, since most instruments live or die by their optical performance. ...[her] articulate communication, clear thinking, and organizational ability will allow her to lead complex instrument projects."

Reviewer (E)

"...she is extremely intelligent, independent, diligent, and resourceful in pursuing her original research. Her thesis work on the extragalactic optical background light (EBL) is the definitive work in the field. ... Her more recent papers show similar hallmarks of good scholarship."

Reviewer (F)

"It is extremely valuable for the University of Michigan to have a faculty member with Dr. Bernstein's ability in instrumentation. It is also useful to have her expertise and insightfulness in stellar populations. ...Bernstein's growing track record in instrumentation is a rare commodity indeed."

Reviewer (G)

"Rebecca emerged as the leader of the optical corrector design because her work was superb. ... I anticipate that she will make further important contributions to DECam in the future. I also expect that she will make important contributions to the science that DES will enable. I know that she is particularly eager to exploit the data for galaxy evolution."

Reviewer (H)

“Let me put MIKE’s success into context. I tell my students that 2/3 of all instruments don’t work. The best gauge of the success of an instrument is whether it is used by people other than its builders, and whether they are happy with it when they use it. MIKE serves a large and satisfied group of users...”

Reviewer (I)

“Rebecca is an extremely bright, extremely energetic and extremely self-critical individual. There is absolutely no possibility that she will rest on her laurels once she is granted tenure. ...she has become a go-to person in the world of optical design (there are really only a handful of such people working in astronomy). ... Her promotion will have exactly the desired effect of freeing her to undertake a wider range of activities with a variety of timescales.”

Reviewer (J)

“Professor Bernstein is a talented scientist who has a promising career ahead of her. Based on her recent accomplishments in the science of Dark Energy she would definitely receive promotion and tenure at my institution.”

Summary of Recommendation:

Professor Bernstein is a national leader in her field and is central to the department’s effort to excel in extragalactic and large-telescope astronomy. She is also a capable and dedicated teacher. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Rebecca A. Bernstein be promoted to the rank of associate professor of astronomy, with tenure, in the College of Literature, Science, and the Arts.



Terrence J. McDonald
Arthur F. Thurnau Professor,
Professor of History, and Dean
College of Literature, Science, and the Arts

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