

# JILLIAN M. BELLOVARY, PH.D

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## Office Address

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## Contact Information

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**Current Position** ASSISTANT PROFESSOR, QUEENSBOROUGH COMMUNITY COLLEGE August 2016 - present

**Previous Positions** HELEN POSTDOCTORAL FELLOW, AMERICAN MUSEUM OF NATURAL HISTORY June 2015 - August 2016

Supervisor: Mordecai-Mark Mac Low

Duties: Research involving black hole growth/evolution, oversight of AMNH BridgeUp: STEM educational program for underrepresented high school girls

POSTDOCTORAL FELLOW, FISK-VANDERBILT BRIDGE PROGRAM, VANDERBILT UNIVERSITY September 2012 - June 2015

Supervisor: Kelly Holley-Bockelmann

Duties: Research involving black hole growth/evolution in cosmological simulations, mentor to several Bridge students, Bridge steering committee

UNIVERSITY OF MICHIGAN October 2010 - August 2012

Postdoctoral Scholar

Supervisor: Marta Volonteri

Duties: Examine black hole seed formation and growth in cosmological simulations

**Education** UNIVERSITY OF WASHINGTON Fall 2010

Ph.D. in Astronomy

Thesis Title: "The Formation and Evolution of Massive Black Holes in Cosmological Simulations"

Thesis Advisors: Fabio Governato & Tom Quinn

UNIVERSITY OF WISCONSIN-MADISON May 2001

B.S. in Astrophysics, Physics and Philosophy (triple major)

**Honors** NSF Graduate Research Fellow, 2007-2010

Best Physics/Astronomy Oral Presentation, SACNAS 2008

Spitzer Visiting Graduate Student Fellowship, Caltech, 2007-2008

Honors in the Major – Astrophysics, UW-Madison, 2001

Graduated with Distinction, UW-Madison, 2001

**Teaching Experience** BRIDGEUP:STEM INSTRUCTOR, AMNH 2015 – 2016

Co-Instructor for BridgeUp Data Visualization and Supercomputing courses, mentor to five high school interns.

ADJUNCT FACULTY, HENRY FORD COMMUNITY COLLEGE Spring 2012

Instructor of record for Introductory Astronomy class and corresponding lab.

INSTRUCTOR, U. WASHINGTON Summer 2008

Instructor of record for Introductory Astronomy class.

	TEACHING ASSISTANT, U. WASHINGTON	Summer 2007
	Led 4 night observing runs at the UW 30" telescope for undergraduate research projects.	
	TEACHING ASSISTANT, U. WASHINGTON	2004 – 2005
	Conducted discussion sections for introductory Astronomy and Solar System courses.	
	TEACHING ASSISTANT, U. WISCONSIN-MADISON	Spring 2004
	Conducted discussion sections and labs for an introductory physics course.	
	U.S. PEACE CORPS, GAMBIA COLLEGE, THE GAMBIA	2001 – 2003
	Lectured physics and biology to teacher-trainees during Peace Corps service.	
	MARIA MITCHELL OBSERVATORY	Summer 2000
	Taught summer science classes for ages 8-12.	
<b>Service &amp; Outreach</b>	NASA LISA STUDY TEAM	Fall 2017 - present
	AAS COMMITTEE FOR THE STATUS OF MINORITIES IN ASTRONOMY	Oct 2015 - Aug 2018
	NSF AAFP SELECTION COMMITTEE	
	CHANDRA TIME ALLOCATION COMMITTEE	
	LOCAL ORGANIZING COMMITTEE	2015
	Inclusive Astronomy, Vanderbilt University, Nashville, TN	
	SACNAS ABSTRACT REVIEWER	2013 - 2015
	Give feedback and rank undergraduate and graduate student abstract submissions for the SACNAS annual conference.	
	FISK-VANDERBILT MASTERS-TO-PHD BRIDGE PROGRAM	2012 – 2015
	Mentor and member of the steering committee for program to increase the representation of minority Ph.Ds in STEM fields	
	PRE-MAJOR IN ASTRONOMY PROGRAM (PRE-MAP)	2005 – 2010
	Active staff member and mentor for a program to increase diversity in astronomy.	
	UW PLANETARIUM	2004 – 2010
Presenter for public planetarium shows ~5 times per year.		
GRADUATE AND PROFESSIONAL STUDENT SENATE	2009 – 2010	
Senator representing the graduate students of the astronomy department.		
GRADUATE STUDENT ADVISOR	2005 – 2007	
Advisor for McNair Scholars and other underrepresented students at the U. Washington Office of Minority Affairs and Diversity.		
<b>Professional Training</b>	WRITING INTENSIVE COURSE TRAINING	2017
	Received training for the development and implementation of Writing Intensive courses at QCC.	
	METHODS OF SCIENTIFIC RESEARCH INSTRUCTOR TRAINING	Summer 2016
Learned techniques for instructing inquiry-based hands-on experiments		
ISEE PROFESSIONAL DEVELOPMENT PROGRAM	2016	
Developed and taught a data analysis and coding bootcamp for Columbia Bridge students using inquiry-based methods.		

CIRTL ONLINE COURSE: “AN INTRODUCTION TO EVIDENCE-BASED UNDERGRADUATE STEM TEACHING”  
Completion Certificate: 2015

**Students**      *Undergraduate Students:*  
**Mentored:** Michael Motte (U. Washington, McNair Scholar, English Major)  
Marrissa Harrison (U. Washington, Anthropology Major)  
Danielle Green (U. Washington, Biology Major)  
Cameron Trujillo (Humboldt State University, Physics/Math Major)  
Colleen Cleary (Hunter College, Physics Major)  
Jonathan Mercedes Feliz (Lehman College, Physics/Math Major)  
Cristian Zambrano (QCC, Computer Science Major)  
Rayhan Shakib (QCC, Computer Science Major)  
Adnan Siraji (QCC, Engineering Major)  
Michelle Luzuriaga (QCC, Physics Major)  
Sarra Hayoune (Hudson County Community College, Comp. Sci. Major)

*Graduate Students:*  
Sandor Van Wassenhove (U. Michigan, PhD Astronomy)  
Bryan Demapan (Fisk U., M.A. Physics)  
Jodie Hawk (Fisk U.)  
Nicole Sanchez (Fisk U., now at U. Washington PhD program)  
Glenna Dunn (Vanderbilt U., current)

**Invited**      COLLOQUIUM, GEORGE MASON UNIVERSITY      May 2019  
**Talks**      ACCRETION SIGNATURES OF THE EARLIEST BLACK HOLES IN THE UNIVERSE, PRINCETON  
**since 2016**      UNIVERSITY      April 2019  
  
SEMINAR, INSTITUTE FOR THEORY AND COMPUTATION, HARVARD-SMITHSONIAN CENTER FOR  
ASTROPHYSICS      February 2019  
  
COLLOQUIUM, UNIVERSITY OF FLORIDA      November 2018  
  
GRAVITATIONAL WAVE WORKSHOP, COLEGIO DE FISICA FUNDAMENTAL Y INTERDISCIPLINARIA  
DE LAS AMERICAS      October 2018  
  
COLLOQUIUM, NASA GODDARD      May 2018  
COLLOQUIUM, LAGUARDIA COMMUNITY COLLEGE      April 2018  
PRESIDENTIAL LECTURE, QUEENSBOROUGH COMMUNITY COLLEGE      April 2018  
YCAA SEMINAR, YALE UNIVERSITY      April 2018  
SEMINAR, EMPIRE STATE COLLEGE      March 2018  
COLLOQUIUM, BROOKLYN COLLEGE      March 2018  
WESTPORT ASTRONOMICAL SOCIETY, WESTPORT, CT      January 2018  
LISA SPECIAL SESSION, AAS 231ST MEETING      January 2018  
COLLOQUIUM, NOAO, TUCSON, AZ      November 2017  
MID-HUDSON ASTRONOMICAL ASSOCIATION, NEW PALTZ, NY      November 2017  
LISA SPECIAL SESSION, AAS HEAD MEETING      August 2017  
NEW JERSEY ASTRONOMICAL ASSOCIATION      July 2017

PHYSICS COLLOQUIUM, UNIVERSITY OF NORTH FLORIDA	February 2017
NEW YORK ASTRONOMICAL ASSOCIATION	December 2016
COMPUTING THE UNIVERSE, OAXACA, MEXICO	June 2016
ASTRONOMY SEMINAR, ICS, UNIVERSITY OF ZURICH	April 2016

**Professional  
Member-  
ships**

AMERICAN ASTRONOMICAL SOCIETY  
SOCIETY FOR THE ADVANCEMENT OF CHICANOS AND NATIVE AMERICANS  
IN SCIENCE (SACNAS)  
NATIONAL SOCIETY OF BLACK PHYSICISTS (NSBP)

**Proposals &  
Grants**

NSF COLLABORATIVE RESEARCH: OF MICE AND MONSTERS – INVESTIGATING THE GROWTH OF BLACK HOLES IN DWARF GALAXIES (Co-PI)  
\$49,000  
September 2018

PSC-CUNY: GRAVITATIONAL WAVE SIGNATURES OF MASSIVE BLACK HOLES IN DWARF GALAXIES  
\$3500  
May 2018

XSEDE: FORMING DIRECT COLLAPSE BLACK HOLES WITH REALISTIC LYMAN-WERNER RADIATION FIELDS IN COSMOLOGICAL HYDRODYNAMIC SIMULATIONS (PI)  
698,436 hours (\$24,220 equivalent)  
December 2015

PSC-CUNY: PREDICTING GRAVITATIONAL WAVE SIGNALS BY MERGING BLACK HOLES IN MIGRATION TRAPS  
\$3500  
May 2017

CUNY- CCRG: CHARACTERIZING MASSIVE BLACK HOLES IN SIMULATIONS OF DWARF GALAXIES  
\$9500  
August 2017

- First Author Refereed Publications** MULTIMESSENGER SIGNATURES OF MASSIVE BLACK HOLES IN DWARF GALAXIES  
**Bellovary, J. M.**, Cleary, C., Munshi, F., Tremmel, M., Christensen, C., Brooks, A., Quinn, T., 2019, MNRAS, 482, 2913
- MIGRATION TRAPS IN DISKS AROUND SUPERMASSIVE BLACK HOLES  
**Bellovary, J. M.**, Mac Low, M.-M., McKernan, B., Ford, K. E. S., 2016, ApJL, 819, L17
- EFFECTS OF INCLINATION ON MEASURING VELOCITY DISPERSION AND IMPLICATIONS FOR BLACK HOLES  
**Bellovary, J. M.**, Holley-Bockelmann, K., Gültekin, K., Christensen, C., Governato, F., Brooks, A., Loebman, S., Mushi, F., 2014, MNRAS, 445, 2667
- THE RELATIVE ROLE OF GALAXY MERGERS AND COSMIC FLOWS IN FEEDING BLACK HOLES  
**Bellovary, J. M.**, Brooks, A., Volonteri, M., Governato, F., Quinn, T., Wadsley, J., 2013, ApJ, 779, 136
- THE FIRST MASSIVE BLACK HOLE SEEDS AND THEIR HOSTS  
**Bellovary, J. M.**, Volonteri, M., Governato, F., Shen, S., Quinn, T., & Wadsley, J., 2011, ApJ, 742, 13
- WANDERING BLACK HOLES IN GALAXY HALOS  
**Bellovary, J. M.**, Governato, F., Quinn, T.R., Wadsley, J., Shen, S., & Volonteri, M., 2010, ApJL, 721, 148
- THE ROLE OF THE RADIAL ORBIT INSTABILITY IN DARK MATTER HALO FORMATION AND STRUCTURE  
**Bellovary, J. M.**, Dalcanton, J.J., Babul, A., Quinn, T.R., Maas, R.W., Austin, C.G., Williams, L.L.R., Barnes, E.I., 2008, ApJ, 685, 739
- SPECTROPOLARIMETRIC CLUES TO THE STRUCTURE AND EVOLUTIONARY STATUS OF MWC 349A  
**Meyer, J. M.**, Nordsieck, K.H., Hoffman, J.L., 2002, AJ, 123, 1639
- Other Refereed Publications** ORBITAL MIGRATION OF INTERACTING STELLAR MASS BLACK HOLES IN DISKS AROUND SUPERMASSIVE BLACK HOLES  
 Secunda, A., **Bellovary, J.**, Mac Low, M., Ford, K.E.S., McKernan, B., Leigh, N., Lyra, W., accepted to ApJ (arxiv:1807.02859)
- CONSTRAINING STELLAR MASS BLACK HOLE MERGERS IN AGN DISKS DETECTABLE WITH LIGO  
 McKernan, B., Ford, K.E.S., **Bellovary, J.**, Leigh, N., Haiman, Z., Bocsis, B., Lyra, W., MacLow, M., Metzger, B., O'Dowd, M., Endlich, S., Rosen, D., 2018, ApJ, 866, 66
- SOWING BLACK HOLE SEEDS: DIRECT COLLAPSE BLACK HOLE FORMATION WITH REALISTIC LYMAN-WERNER RADIATION IN COSMOLOGICAL SIMULATIONS  
 Dunn, G., **Bellovary, J.**, Holley-Bockelmann, K., Christensen, C., Quinn, T., 2018, ApJ, 861,39
- COSMOLOGICAL HYDRODYNAMIC SIMULATIONS OF PREFERENTIAL ACCRETION IN THE SMBH OF MILKY WAY SIZE GALAXIES  
 Sanchez, N., **Bellovary, J.**, Holley-Bockelmann, K., Tremmel, M., Brooks, A., Governato, F., Quinn, T., Volonteri, M., Wadsley, J., 2018, ApJ, 860, 20
- ON THE RATE OF BLACK HOLE BINARY MERGERS IN GALACTIC NUCLEI DUE TO DYNAMICAL HARDENING

Leigh, N., Geller, A., McKernan, B., Ford, K. E. S., Mac Low, M. -M., **Bellovary, J.**, Haiman, Z., Lyra, W., Samsing, J., O'Dowd, M., Kocsis, B., Endlich, S., 2018, MNRAS, 474, 5672

THE EVOLUTION OF KICKED STELLAR-MASS BLACK HOLES IN STAR CLUSTER ENVIRONMENTS  
Webb, J., Leigh, N., Singh, A., Ford, K. E. S., McKernan, B., **Bellovary, J.**, 2018, MNRAS, 474, 3835

THE CONTRIBUTION OF OUTER H I DISKS TO THE MERGING BINARY BLACK HOLE POPULATION  
Chakrabarti, S., Chang, P., O'Shaughnessy, R., Brooks, A., Shen, S., **Bellovary, J.**, Gladysz, W., Belczynski, C., 2017, ApJ, 840, 4

THE ROMULUS COSMOLOGICAL SIMULATIONS; A PHYSICAL APPROACH TO THE FORMATION, DYNAMICS AND ACCRETION MODELS OF SMBHS  
Tremmel, M., Karcher, M., Governato, F., Volonteri, M., Quinn, T., Pontzen, A., Anderson, L., **Bellovary, J.**; 2017, MNRAS, 470, 1121

THE BIRTH OF A SUPERMASSIVE BLACK HOLE BINARY  
Pfister, H., Lupi, A., Capelo, P., Volonteri, M., **Bellovary, J.**, Dotti, M.; 2017, MNRAS, 471, 3646

A SURVEY OF DUAL ACTIVE GALACTIC NUCLEI IN SIMULATIONS OF GALAXY MERGERS: FREQUENCY AND PROPERTIES  
Capelo, P., Dotti, M., Volonteri, M., Mayer, L., **Bellovary, J.**, Shen, S.; 2017, MNRAS, 469, 4437

THE PAIRING OF ACCRETING MASSIVE BLACK HOLES IN MULTIPHASE CIRCULAR DISKS: THE INTERPLAY BETWEEN RADIATIVE COOLING, STAR FORMATION, AND FEEDBACK PROCESSES  
Souza Lima, R., Mayer, L., Capelo, P., **Bellovary, J.**, 2017, ApJ, 838, 13

BAR-DRIVEN EVOLUTION AND QUENCHING OF SPIRAL GALAXIES IN COSMOLOGICAL SIMULATIONS  
Spinoso, D., Bonoli, S., Dotti, M., Mayer, L., Madau, P., **Bellovary, J.**, 2017, MNRAS, 465, 3729

SUPERMASSIVE BLACK HOLE PAIRS IN CLUMPY GALAXIES AT HIGH REDSHIFT: DELAYED BINARY FORMATION AND CONCURRENT MASS GROWTH  
Tamburello, V.; Capelo, P.; Mayer, L.; **Bellovary, J.**; Wadsley, J.; 2017; MNRAS, 464, 2952

THE EFFECTS OF HOST GALAXY PROPERTIES ON MERGING COMPACT BINARIES DETECTABLE BY LIGO  
O'Shaughnessy, R., **Bellovary, J.**, Brooks, A., Shen, S., Governato, F., Christensen, C., 2017, MNRAS, 464, 2831

BLACK HOLE STARVATION AND BULGE EVOLUTION IN A MILKY WAY-LIKE GALAXY  
Bonoli, S.; Mayer, L.; Kazantzidis, S.; Madau, P.; **Bellovary, J.**; Governato, F.; 2016, MNRAS, 459, 2603

A COMPARISON OF BLACK HOLE GROWTH IN GALAXY MERGERS WITH GASOLINE AND RAMSES  
Gabor, J.; Capelo, P.; Volonteri, M.; Bournaud, F.; **Bellovary, J.**; Governato, F.; Quinn, T.; 2016, A&A, 819, 17

BLACK HOLE ACCRETION VERSUS STAR FORMATION RATE: THEORY CONFRONTS OBSERVATIONS  
Volonteri, M.; Capelo, P.; Netzer, H.; **Bellovary, J.**; Dotti, M.; Governato, F.; 2015, MNRAS, 452, 6

GROWING BLACK HOLES AND GALAXIES: BLACK HOLE ACCRETION VERSUS STAR FORMATION RATE

Volonteri, M.; Capelo, P.; Netzer, H.; **Bellovary, J.**; Dotti, M.; Governato, F.; 2015, MNRAS, 449, 1470

MASSIVE BLACK HOLE SCIENCE WITH eLISA

Barausse, E.; **Bellovary, J.**; Berti, E.; Holley-Bockelmann, K.; Farris, B.; Sathyaprakash, B.; Sesana, A.; JPhCS, 610, 012001

GROWTH AND ACTIVITY OF BLACK HOLES IN GALAXY MERGERS WITH VARYING MASS RATIOS  
Capelo, P.; Volonteri, M.; Dotti, M.; **Bellovary, J.**; Mayer, L.; & Governato, F.; 2015, MNRAS, 447, 2123

NUCLEAR COUPS: DYNAMICS OF BLACK HOLES IN GALAXY MERGERS

Van Wassenhove, S.; Capelo, P.; Volonteri, M.; Dotti, M.; **Bellovary, J.**; Mayer, L.; & Governato, F.; 2013, MNRAS, 439, 474

BLACK HOLES IN THE EARLY UNIVERSE

Volonteri, M., & **Bellovary, J.**, 2012, Reports on Progress in Physics, 75, 124901

MILKY WAY TOMOGRAPHY IV: DISSECTING DUST

Berry, M., Ivezić, Ž., Sesar, B., Jurić, M., Schlafly, E., **Bellovary, J.**, et al.; 2012, ApJ, 757, 166

OBSERVABILITY OF DUAL AGN IN MERGING GALAXIES

Van Wassenhove, S.; Volonteri, M., Mayer, L., Dotti, M., **Bellovary, J.**, & Callegari, S.; 2012, ApJL, 748, 7

SMBH FORMATION VIA GAS ACCRETION IN NUCLEAR STELLAR CLUSTERS

Davies, M. B.; Miller, M. C.; & **Bellovary, J.M.**; 2011, ApJL, 740, 42

GROWING MASSIVE BLACK HOLE PAIRS IN MINOR MERGERS OF DISK GALAXIES

Callegari, S.; Kazantzidis, S.; Mayer, L.; Colpi, M.; **Bellovary, J. M.**; Quinn, T.; Wadsley, J., 2011, ApJ, 729, 85

STAR FORMATION AND FEEDBACK IN SPH SIMULATIONS II: RESOLUTION EFFECTS

Christensen, C., Quinn, T., Stinson, G., **Bellovary, J.**, Wadsley, J., 2010, ApJ, 717, 121

THE NATURE OF HI ABSORBERS IN GRB AFTERGLOWS: CLUES FROM HYDRODYNAMIC SIMULATIONS

Pontzen, A., Deason, A., Governato, F., Pettini, M., Wadsley, J., Quinn, T., Brooks, A., **Bellovary, J.**, & Fynbo, J. , 2010, MNRAS, 402, 1523

A LARGE, UNIFORM SAMPLE OF X-RAY-EMITTING ACTIVE GALACTIC NUCLEI FROM THE ROSAT ALL SKY AND SLOAN DIGITAL SKY SURVEYS: THE DATA RELEASE 5 SAMPLE

Anderson, S. F., Margon, B., Voges, W., Plotkin, R. M., Syphers, D., Haggard, D. Collinge, M.J., **Meyer, J.M.**, Strauss, M.A., Agüeros, M. A., et al. 2007, AJ, 133, 313