

Resume – Dr. Stefi Baum, 9/1/2008

Dr. Stefi Alison Baum  
Director and Professor  
Chester F. Carlson Center for Imaging Science  
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Date and Place of Birth	Dec 11, 1958; Chicago Illinois
High School	June 1976 Princeton Public High School, Princeton, NJ
College	June 1980 Harvard University, Cambridge, MA B. A. Physics, cum laude
Graduate School	June 1987 University of Maryland, College Park, MD Ph.D. Astronomy

Post-Degree Education

American Council on Education (ACE):

- Chairing the Academic Department

MIT-Sloan Executive Series:

- System Dynamics for Senior Managers
- Managing Technical Professionals and Organizations
- The Innovative Organization

Harvard-MIT-Tufts Program on Negotiation, Executive Ed Series:

- Program on Negotiation for Senior Executives
- Dealing with Difficult People and Difficult Situations

Foreign Service Institute

- Global Issues

Expertise

Scientific research expertise in imaging science and astrophysics, specializing in understanding the origin and nature of active galaxies and clusters of galaxies and the development and deployment of observational instrumentation and missions. Over 160 refereed journal articles published. Well versed in a range of scientific issues and disciplines and the application of scientific, statistical, and engineering methodology. Experience with college level pedagogy development in science and innovation, K-12 science education and public outreach, and programs to recruit women and minorities to STEM careers. Science policy experience. Extensive management and leadership experience, in a range of environments including government, national centers, and academia.

Languages: English – proficient (native language), Dutch – moderate proficiency,  
French – some proficiency

Security Clearance Top Secret (currently inactive)

Leadership and Management Experience

- Director, Chester F. Carlson Center for Imaging Science (CIS), Rochester Institute of Technology. CIS is a highly interdisciplinary academic education and research center at RIT, providing undergraduate education, post graduate PhD and masters programs and extensive research activities in a range of imaging related fields including remote sensing, astronomy, biomedical imaging, color science, visual perception, printing and document reconstruction.
- Division Head, Engineering Software and Services Division, Space Telescope Science Institute. Responsible for the leadership and management of 140 software developers, testers, systems engineers, scientists and hardware engineers supporting the Hubble Space Telescope and the James Webb Space Telescope.
- Branch Chief/Team Lead. Management and Leadership responsibility for 25 PhD astronomers and technical staff supporting the development and operation of an advanced scientific instrument for the Hubble Space Telescope, the Space Telescope Imaging Spectrograph.
- Lead Archive Scientist –Provided scientific oversight of the HST archive development and deployment.

Direct Government Experience

- American Institute of Physics State Department Science Policy Fellow, United States Dept. of State, Economics Bureau, Office of Agriculture , Biotechnology, and Textiles.

<b>Timeline</b>	<b>Professional Career</b>	<b>Academic Career</b>
7/04 - present	Director, Center for Imaging Science, Rochester Institute of Technology	Full Professor, RIT, Endowed Xerox Chair since 2007.
11/02-6/04	Senior Science/Diplomacy Fellow, <i>US Dept. of State</i> & American Institute of Physics Diplomacy Fellow Program	leave of absence from STScI
9/02 - ongoing		Co-I & Lead Operations Scientist, NIRCAM on JWST
10/02		Promoted to Full Astronomer, Space Telescope Science Institute ( <i>STScI</i> )
11/99 – 10/02	Division Head, Engineering & Software Services Division, <i>STScI</i>	
9/99 -11/99	Deputy, Science and Engineering Support Division, <i>STScI</i>	
1/99 - 9/99		Sabbatical @ <i>Princeton Univ.</i>
2/96 -12/98	Branch Chief, Spectrographs Team, <i>STScI</i>	Awarded tenure 1997 <i>STScI</i>
1/95 – 2/96	Space Telescope Imaging Spectrograph	

	Scientist, Servicing Mission Office, <i>STScI</i>	
10/91 - 1/95	Archive Scientist, <i>STScI</i>	Promoted to Associate Astronomer 1994 <i>STScI</i>
9/90-10/91		Hubble Fellow, <i>Johns Hopkins University</i>
9/87-9/90		Postdoctoral Research Fellow, <i>Netherlands Foundation for Research in Astronomy</i>

#### Addresses for Employment History

- Carlson Center for Imaging Science, College of Science, ***Rochester Institute of Technology***, 54 Lomb Memorial Drive, Rochester NY 14623
- Office of Agriculture, Biotechnology & Trade Policy, Economics & Business Bureau, ***US Dept of State***, 2201 C Street NW, Washington DC 20520
- ***Space Telescope Science Institute***, 3700 San Martin Dr., Baltimore, MD 21218
- ***Johns Hopkins University***, Department of Physics and Astronomy, Bloomberg Center, Homewood Campus, Baltimore, MD 21218
- ***Netherlands Foundation for Research in Astronomy***, P. O. Box 2, 7990 AA Dwingeloo, NL

#### Fellowships and Awards

- American Institute of Physics – US State Department Fellowship 2002/2003
- STScI Individual Achievement Award, for Management/Leadership of ESS, 2002
- Rolex Achievement Award 1999 – given annually to one female and one male college lacrosse player for career achievements supporting society.
- NASA Excellence Award, Hubble Space Telescope Servicing Mission 3A (1999)
- STScI Group Achievement Award, Space Telescope Imaging Spectrograph Team, (1996)
- STScI Individual Achievement Award, Space Telescope Imaging Spectrograph (1996)
- STScI Group Achievement Award, Data Quality Project (1996)
- STScI Individual Achievement Award, Archive Development/Deployment (1993)
- STScI Group Achievement Award, Archive Development/Deployment (1993)
- Annie Jump Cannon Award, awarded annually to a young female astronomer for Scientific Excellence and Promise (1993)
- Junior Research Fellowship, National Radio Astronomy Observatory (1985)

#### Board and Oversight Committee Memberships (over past 4 years)

- Trustee, Universities Space Research Association (USRA), and member of the USRA Board Compensation and Strategic Planning Committees
- VP, Board of Directors, Society for Imaging Science and Technology (IS&T)
- Board of Governors, Great Lakes Research Consortium.
- Advisory Board, Program for Innovation and Entrepreneurship, RIT
- Advisory Board, School of Mathematics and Statistics, RIT

- Chair, Associated Universities Incorporated (AUI), National Radio Astronomy Observatory Visiting Committee
- Member, National Research Council of Canada, Peer Review of the Herzberg Institute of Astrophysics
- Member, National Astronomy and Ionospheric Center Arecibo Visiting Committee
- Member, Director's Review, Dark Energy Camera and Survey, Fermi National Laboratory
- Member, NASA Senior Review
- Member, Associated Universities Incorporated Operations Advisory Group
- Member, Operations Advisory Committee and Science Advisory Group, Extended Very Large Array Telescope, National Radio Astronomy Observatory.

Formal Task Force and Working Group Activities (past 4 years)

- Member, Rochester Institute of Technology President's Women's Advisory Council (term completed)
- Member, Rochester Institute of Technology, Provost Search Committee (completed)
- Member, Rochester Institute of Technology's Research Steering Committee
- Member, Rochester Institute of Technology, Creativity and Innovation Working Group (completed)
- Member, Rochester Museum and Science Center K-12 Education Task Force
- Member, Rochester Museum and Science Center Planetarium Task Force
- Creator and Chair, College of Science Distinguished Speaker Series
- Member, Innovation Curriculum Working Group

Curriculum Development, Teaching, Education and Public Outreach (past 4 years)

- Co-Developer, new PhD Program at Rochester Institute of Technology, Astrophysical Science and Technology (initiated 9/2008), currently serving as acting co-Director of this PhD program.
- Member, Curriculum Committee, Sustainability Institute, Rochester Institute of Technology
- Co-Developer and teacher, Frontiers of Science, general education course, Rochester Institute of Technology
- Co-Developer, PhysCalc integrated bridge course, to prepare students for the university physics and calculus sequence, Rochester Institute of Technology
- Collaborator, Honors Curriculum Collaborative Creativity and Innovation Program, Rochester Institute of Technology.
- Collaborator, Insight Lab for Science Outreach and Learning Research, Rochester Institute of Technology
- Lead, "Reach for the Stars" outreach program with the Girl Scouts of Western NY
- Collaborator – "Stepping Stones to Research" Program with local high school
- Participant, yearly summer high school intern program sponsored by the Center for Imaging Science at Rochester Institute of Technology.

- Engaged with – North Star Center in STEM Summer Program for prefreshman. The North Star Center exists primarily to improve the retention of underrepresented populations.

#### Astronomical Research and Service

- Space and ground based observations of Active Galaxies, Galaxy Clusters, & High Redshift Systems.
- Analysis and interpretation of the origin and nature of activity in galaxies and the evolution of galaxies and galaxy clusters.
- Observational techniques: Optical and ultra-violet spectroscopy and imaging, radio interferometric imaging and spectroscopy, X-ray imaging.
- Engaged in activities to develop astronomical algorithms, hardware, and missions.
- Current member, Science Team, Near Infrared Camera, James Webb Space Telescope.
- Over 160 scientific papers published in refereed journals.
- Over 75 professional colloquia given at Universities and Scientific Conferences
- Have served and continue to serve on numerous NASA & NSF scientific review panels for space & ground based observatories.
- Served on Financial Review Committees for HST and for Chandra.
- Served on American Astronomical Society Employment Subcommittee

#### Professional Societies

- American Astronomical Society
- American Association for the Advancement of Science
- American Institute of Physics
- International Astronomical Union
- SPIE

#### Graduate Theses Supervised or Co-Supervised

- Jack Gallimore – “The Kinematics of the Near Nuclear Gas in Seyfert Galaxies” 1995, U. Maryland, PhD
- Ed Colbert – “Superwinds in Seyfert Galaxies” 1997, U. Maryland, PhD
- Chun Xu – “VLBA and ROSAT Imaging of Nearby Radio Galaxies: Towards Understanding the Nature of Radio Activity”, masters received, PhD on hold, U. Maryland
- Gijs Verdoes-Klein – “Nuclei of Nearby Radio Galaxies: Interplay Between Activity and Galaxy Structure” – 2001, Leiden, PhD
- Jacob Noel-Storr – “Kinematics of the Central Regions of Nearby Radio Galaxies: Constraining the Demographics of Black Holes” – 2004, Columbia Univ, NY, PhD
- David Russell – “Ultraviolet Observations of Radio Jets: Constraints on Jet Physics” – 2004, University of Manchester, PhD
- Avanti Tilak – “Chandra and VLBA Observations of Low Luminosity Radio Galaxies” – current, Johns Hopkins University, PhD
- George Privon – “Emission Line Imaging of Powerful Radio Galaxies”, Rochester Institute of Technology, current, masters.

- Andrew Michael – “Classification of Schizophrenia Using fMRI Imaging” - Rochester Institute of Technology, current, PhD
- Linpeng Cheng – “Interpixel Capacitance in IR Arrays for Astronomy - Implications for the James Webb Space Telescope”, Rochester Institute of Technology, current, Masters
- Grant Tremblay – “The Evolution of Powerful Radio Galaxies”, Rochester Institute of Technology, current PhD

#### Postdocs Supervised or Co-Supervised

- Esther Zirbel
- Anton Koekemoer
- Marek Kukula
- Andre Martel
- Catherine Buchanan
- Preeti Kharb
- Jake Noel-Storr

#### Meetings co-Organized

- Analysis of Emission Lines, STScI May Symposium 1993
- Women in Astronomy, IAU General Assembly Session 1994
- NGC1068 – Galaxy, Starburst and AGN 1996
- Galaxies at the Highest Resolution, IAU Symposium 1999
- National Academy of Science workshop on Global Challenges and Directions for Agricultural Biotechnology, 2004
- The Extended Very Large Array Vision: Galaxies through Cosmic Time, 2008

#### External Grant Support (complete list provided at end of resume)

- Grants totaling over 3.75 Million during past four years, ~45% as Principal Investigator. Currently have submitted additional grants, pending review, totaling just over 3.5 Million.
  - NYSTAR Faculty Development Grant, PI - \$729,000 in area of Sensor Development 5/2006
  - Scientific Research Grants, totaling over 2.25 Million
  - An NSF Advance PAID Grant, “Establishing the Foundation for Future Organizational Reform and Transformation”, ~\$200,000
  - Education and Outreach grants totaling ~\$60,000

#### External Gift Support

Over the past 4 year period, the Chester F. Carlson Center for Imaging Science has received over 4 Million dollars of donations in support of our programs, students, and research, as recorded by the RIT Development Office.

## **Research Synopsis – Stefi Alison Baum**

### ***Preamble***

I am an observational, extragalactic astronomer, working with ground based optical and radio data as well as space based optical, ultraviolet, and X-ray data. The main focus of my research is the physical nature, origin, and life cycles of activity in galaxies. Activity in galaxies is an interesting phenomenon worthy of study in its own right, but activity in galaxies also serves as a beacon - allowing us to study the evolution of galaxies at redshifts where ‘normal’ galaxies are invisible and providing us with insights into the nature, formation and evolution of the central regions of all galaxies. The evidence has been mounting that activity and galaxy evolution go hand in hand as we now believe that (1) galaxies were assembled coevally with the dramatic evolution in AGN populations, (2) central black holes grew in concert with the growth of galaxy bulges, (3) massive black hole growth was dominated by periods of high accretion producing spinning black holes, (4) star formation always accompanies nuclear activity, and (5) nuclear activity is cyclic. This has established a new paradigm in which galaxy and black hole evolution are tightly coupled.

In my research, I work to understand both the fundamental physical processes responsible for energetic nuclear activity, and the coupling between the formation and evolution of central black holes and galaxy formation. My interest in active galactic nuclei (hereafter AGN) has led me to study powerful radio galaxies, quasars, Seyfert galaxies, starburst galaxies, and normal galaxies. I look for clues in the different manifestations of activity in these different types of galaxies with which to unravel the fundamental mysteries of AGN. What makes a given galaxy turn on as an AGN? Are all galaxies active at some stage in their lives, or are only a small percentage of galaxies capable of extreme nuclear activity? What determines what form activity in a galaxy will take (e.g., powerful radio source, a luminous ultraviolet source, a starburst instead of a monster) and how is the way the activity is manifested related to the properties of the host galaxy or the presence or physical properties (e.g., size, spin) of a central black hole? What governs the fuel supply to the central source? How does the nuclear activity in a given galaxy evolve with time and how does that evolution affect or parallel the evolution of the host galaxy and its environment? Below I describe some of my key scientific contributions, many of which have been carried out with my graduate students Gallimore, Xu, Verdoes-Klein, and Noel-Storr.

### ***Life Cycles of Active Galactic Nuclei***

My thesis research found a tight correlation between the properties of the emission line nebulae and the extended radio emission in powerful radio galaxies (1,2) providing important diagnostics of the interaction of the expanding radio source with its environment. The kinematics of emission line gas in radio galaxies evolves with redshift

primarily due to the cosmic evolution in the host galaxies environment (7). At low redshifts, we have used a sample of low luminosity radio galaxies to show that the morphology of the emission line gas and dust reflects the dynamical evolution of the cannibalized gas from a merger which is likely fueling the activity (11). Using HST/STIS (12), we have shown that the kinematics of the nuclear gas, while consistent with an overall rotational pattern, are complex, showing non-rotational motions which may be closely tied to and hold clues to the physics of the fueling of the AGN.

The correlation we (and others) find between emission line luminosity and radio luminosity (2,10) suggests a fundamental link between the power radiated by an AGN accretion disk and the kinetic energy carried by the jets. We presented the first fully relativistic treatment of the surface brightness evolution of expanding relativistic jets and showed that the jets in 3C264 must decelerate as they propagate (4).

There are a range of manifestations of AGN activity and a key problem has been understanding the mechanisms underlying the observed variety. Our work has shown that the rate of accretion onto the central AGN must be an important parameter (3,5). Seyfert galaxies provide local examples of AGN for detailed scrutiny (9). Using VLBI techniques, we have obtained the first image of the ionized inner edge of the obscuring torus-like region (6). We have also have shown that the AGNs in Seyferts are capable of driving powerful kpc scale winds (8).

### ***The Complex Cores of Rich Clusters of Galaxies.***

The intracluster medium (ICM) of rich clusters of galaxies is rich in complex physics where magnetic fields, hot gas, radiation, stars, and energy input from AGN all play a role (15,16,17, 18). The emission line nebulae provide important constraints on the balance of heating and cooling in the ICM and the ionizing photon field (13). Our searches for cold gas in clusters revealed that the amount of gas cooling and dropping out of the hot ICM is lower than originally estimated (14). Our HST FUV imaging of clusters has shown that ongoing star formation appears to be a significant sink for any cooling gas and may also dominate the energy budget for the emission line nebulae (15). We used Spitzer IRAC and MIPS photometry to undertake a census of star formation in a sample of 62 Brightest Cluster Galaxies (BCGs) in cool core clusters. We find that star formation is common in these BCGs. The star formation rates are proportional to the mass accretion rates determined from the hot X-ray emitting gas, but are much lower. This constrains the re-heating of the ICM in these cluster cores to be very effective in reducing the amount of mass cooling from the hot phase, but not eliminating it completely (16).

### ***List of Key Selected Scientific Publications, referenced above.***

1. **S.A. Baum** and T. Heckman, "Extended Optical Line Emitting Gas in Powerful Radio Galaxies: Statistical Properties and Physical Conditions," *Astrophysical Journal*, 336, 681 (1989).

2. **S.A. Baum** and T. Heckman, "Extended Optical Line Emitting Gas in Powerful Radio Galaxies: What is the Radio Emission-Line Connection?" *Astrophysical Journal*, 336, 702 (1989).
3. **S.A. Baum**, T.M. Heckman, W. van Breugel, "Long Slit Optical Spectroscopy of Emission Line Nebulae in Radio Galaxies: Interpretation," *Astrophysical Journal*, 389, 208 (1992).
4. **S.A. Baum**, C.P. O'Dea, *et al.* "HST and MERLIN Observations of 3C264 – A Laboratory for Jet Physics and Unified Schemes," *Astrophysical Journal*, 483, 178 (1997).
5. **S.A. Baum**, E. Zirbel, and C.P. O'Dea, "Towards Understanding the Fanaroff-Riley Dichotomy in Radio Source Morphology and Power," *Astrophysical Journal*, 451, 88 (1995).
6. J.F. Gallimore, **S.A. Baum**, and C.P. O'Dea, "A Direct Image of the Obscuring Disk Surrounding the Active Galactic Nucleus of NGC 1068," *Nature*, 388, 852-854 (1997).
7. **S.A. Baum**, Patrick J. McCarthy, "Emission-Line Properties of 3CR Radio Galaxies, III. Origins and Implications of the Velocity Fields," *Astronomical Journal*, 119, 2634 (2000).
8. **S.A. Baum**, C.P. O'Dea, D. Dallacassa, A.G. de Bruyn, A. Pedlar, "Kiloparsec-Scale Radio Emission in Seyfert Galaxies; Evidence for Starburst-Driven Superwinds?" *Astrophysical Journal*, 419, 553 (1993).
9. J.F. Gallimore, **S.A. Baum**, C.P. O'Dea, "The Sub-arcsecond Radio Structure in NGC 1068: II. Implications for the Central Engine and Unifying Schemes," *Astrophysical Journal*, 464, 198 (1996).
10. C. Xu, M. Livio, **S.A. Baum**, "Radio-Loud and Radio-Quiet Active Galactic Nuclei," *Astronomical Journal*, 118, 1169 (1999).
11. G.A. Verdoes Kleijn, **S.A. Baum**, P.T. de Zeeuw, and C.P. O'Dea, "Hubble Space Telescope Observations of Nearby Radio-Loud Early-Type Galaxies," *Astronomical Journal*, 118, 2592 (1999).
12. J. Noel-Storr, PhD Thesis, "Hubble Space Telescope Spectroscopy of Nuclear Gas Disks in Radio-Loud, Early-Type Galaxies," Columbia University of NY, 2004
13. T.M. Heckman, **S.A. Baum**, W.J.M. van Breugel, and P. McCarthy, "Dynamical, Physical, and Chemical Properties of Emission-Line Nebulae in Cooling Flows," *Astrophysical Journal*, 338, 48 (1989).
14. C.P. O'Dea, **S.A. Baum**, P.R. Maloney, L.J. Tacconi, W.B. Sparks, "Constraints on Molecular Gas in Cooling Flows and Powerful Radio Galaxies," *Astrophysical Journal*, 422, 467 (1994).
15. C.P. O'Dea, **S.A. Baum**, J. Mack, A. Koekemoer, A. Laor, "Hubble Space Telescope STIS Far-Ultraviolet Observations of the Central Nebulae in the Cooling Core Clusters A1795 and A2597," *Astrophysical Journal*, 612, 131 (2004).
16. A.M. Koekemoer, C.P. O'Dea, C.L. Sarazin, B.R. McNamara, M. Donahue, G.M. Voit, **S.A. Baum**, J.F. Gallimore, "The Extended Blue Continuum and Line Emission around the Central Radio Galaxy in Abell 2597," *Astrophysical Journal*, 525, 621 (1999).

17. **S.A. Baum** and C.P. O’Dea, “Multifrequency VLA Observations of PKS 0745-191: the Archetypal ‘Cooling Flow’ Radio Source?” *Monthly Notices of the Royal Astronomical Society*, 250, 737 (1991).
18. **S.A. Baum**, “What We Learn About Cooling Flows Through the Study of the  $10^4$  K Gas in Clusters,” *PASP*, 104, 848 (1992).
19. C. P. O’Dea, **S. A. Baum**, et al., “An Infrared Survey of Brightest Cluster Galaxies, II Why are some Brightest Cluster Galaxies Forming Stars?” 2008, *ApJ*, 681, 1035

## COMPLETE BIBLIOGRAPHY, STEFI ALISON BAUM

### Articles in Refereed Journals

1. **S.A. Baum** and S. Hoban, “A Search for the Millimeter Wave Transitions of  $\text{CO}^+$  in Comet P/Halley,” *Icarus*, 67, 515 (1986).
2. T.M. Heckman, E.P. Smith, **S.A. Baum**, W.J.M. van Breugel, G.K. Miley, G.D. Illingworth, G.D. Bothun, and B. Balick, “Galaxy Collisions and Mergers: The Genesis of Very Powerful Radio Sources,” *Astrophysical Journal*, 311, 526 (1986).
3. S. Hoban and **S.A. Baum**, “A VLA Search For 2 cm Continuum Emission From Comet P/Halley,” *Icarus*, 70, 264 (1987).
4. R. Elston and **S.A. Baum**, “VLA Observations of W50: A Study of the Interaction of SS433 with its Environment,” *Astronomical Journal*, 94, 1633 (1987).
5. C.P. O’Dea and **S.A. Baum**, “A Search for OH Absorption in NGC 1275,” *Astronomical Journal*, 94, 1476 (1987).
6. **S.A. Baum**, T. Heckman, A.H. Bridle, W. van Breugel, and G.K. Miley, “Extended Emission Line Gas in Radio Sources: Broad Band Optical Imaging, Narrow Band Optical Imaging, and Radio Imaging of a Representative Sample,” *Astrophysical Journal Supplements*, 68, 643 (1988).
7. **S.A. Baum** and T. Heckman, “Extended Optical Line Emitting Gas in Powerful Radio Galaxies: Statistical Properties and Physical Conditions,” *Astrophysical Journal*, 336, 681 (1989).
8. **S.A. Baum** and T. Heckman, “Extended Optical Line Emitting Gas in Powerful Radio Galaxies: What is the Radio Emission-Line Connection?” *Astrophysical Journal*, 336, 702 (1989).
9. T.M. Heckman, **S.A. Baum**, W.J.M. van Breugel, and P. McCarthy, “Dynamical, Physical, and Chemical Properties of Emission-Line Nebulae in Cooling Flows,” *Astrophysical Journal*, 338, 48 (1989).
10. C.P. O’Dea, **S.A. Baum**, and G.B. Morris, “CCD Observations of GigaHerz-Peaked-Spectrum Radio Sources,” *Astronomy and Astrophysics Supplements*, 82, 261 (1990).

11. **S.A. Baum**, C.P. O’Dea, D.W. Murphy, and A.G. de Bruyn, “01801+388: A Compact Double Source with Surprising Properties,” *Astronomy and Astrophysics*, 232, 19 (1990).
12. M.V. Penston *et al.*, “The Extended Narrow Line Region of NGC4151 I-Emission Line Ratios and Their Implications,” *Astronomy and Astrophysics*, 236, 53 (1990).
13. C. Stanghellini, **S.A. Baum**, C.P. O’Dea, G.B. Morris, “Extended Radio Emission Associated with GigaHerz-Peaked-Spectrum Radio Sources,” *Astronomy and Astrophysics*, 233, 379 (1990).
14. **S.A. Baum**, T.M. Heckman, W. van Breugel, “Long Slit Optical Spectroscopy of Emission Line Nebulae in Radio Galaxies: The Data,” *Astrophysics Journal Supplements*, 74, 389 (1990).
15. C.P. O’Dea, **S.A. Baum**, C. Stanghellini, G.B. Morris, A.R. Patnaik, Gopal-Krishna, “Multifrequency VLA Observations of GHz-Peaked-Spectrum Radio Cores,” *Astronomy and Astrophysics Supplements*, 84, 549 (1990).
16. A.H. Bridle, **S.A. Baum**, R. Fanti, P. Parma, E.B. Fomalont and R.D. Ekers, “WSRT and VLA Observations of the Radio Galaxy B2 0326+39 at 0.6, 1.5 and 5 GHz,” *Astronomy and Astrophysics*, 245, 371 (1991).
17. N.E. Kassim, **S.A. Baum**, K.W. Weiler, “A New Look at the ‘Jet’ in the CTB37A/B SNR Complex,” *Astrophysical Journal*, 374, 212 (1991).
18. **S.A. Baum** and C.P. O’Dea, “Multifrequency VLA Observations of PKS 0745-191: the Archetypal ‘Cooling Flow’ Radio Source?” *Monthly Notices of the Royal Astronomical Society*, 250, 737 (1991).
19. C.P. O’Dea, **S.A. Baum**, and C. Stanghellini, “What are the GHz-Peaked-Spectrum Radio Sources?” *Astrophysical Journal*, 380, 66 (1991).
20. **S.A. Baum**, T.M. Heckman, W. van Breugel, “Long Slit Optical Spectroscopy of Emission Line Nebulae in Radio Galaxies: Interpretation,” *Astrophysical Journal*, 389, 208 (1992).
21. A.R.S. Black, **S.A. Baum**, J.P. Leahy, R.A. Perley, J.M. Riley, and P.A.G. Scheuer, “A Study of FR II Radio Galaxies with  $z < 0.15$ ,” *Monthly Notices of the Royal Astronomical Society*, 256, 186 (1992).
22. **S.A. Baum**, “What We Learn About Cooling Flows Through the Study of the  $10^4$  K Gas in Clusters,” *PASP*, 104, 848 (1992).
23. C.P. O’Dea, **S.A. Baum**, C. Stanghellini, A. Dey, W. van Breugel, S. Deustua, and E.P. Smith, “Radio and Optical Observations of 0218+357: The Smallest Einstein Ring?” *Astronomical Journal*, 104, 1320 (1992).
24. A. Pedlar, D. Longley, M. Kukula, T.B. Muxlow, D.J. Axon, **S.A. Baum**, C.P. O’Dea, and S.W. Axon, “The Radio Nucleus of NGC 4151 at 5 and 8 GHz,” *Monthly Notices of the Royal Astronomical Society*, 263, 471 (1993).
25. C. Stanghellini, C.P. O’Dea, **S.A. Baum**, and E. Laurikainen, “Optical CCD Imaging of GHz Peaked Spectrum Radio Sources,” *Astrophysical Journal Supplements*, 88, 1 (1993).
26. **S.A. Baum**, C.P. O’Dea, D. Dallacassa, A.G. de Bruyn, A. Pedlar, “Kiloparsec-Scale Radio Emission in Seyfert Galaxies; Evidence for Starburst-Driven Superwinds?” *Astrophysical Journal*, 419, 553 (1993).

27. C.P. O’Dea, **S.A. Baum**, P.R. Maloney, L.J. Tacconi, W.B. Sparks, “Constraints on Molecular Gas in Cooling Flows and Powerful Radio Galaxies,” *Astrophysical Journal*, 422, 467 (1994).
28. T.M. Heckman, C.P. O’Dea, **S.A. Baum**, and E. Laurikainen, “Obscuration, Orientation, and the Infrared Properties of Radio-loud Active Galaxies,” *Astrophysical Journal*, 428, 65 (1994).
29. J. Gallimore, **S.A. Baum**, C.P. O’Dea, E. Brinks, and A. Pedlar, “Neutral Hydrogen Absorption in NGC 1068 and NGC 3079,” *Astrophysical Journal Letters*, 422, L13 (1994).
30. C.P. O’Dea, **S.A. Baum**, and J.F. Gallimore, “Detection of Extended HI Absorption towards PKS 2322-123 in Abell 2597,” *Astrophysical Journal*, 436, 669 (1994).
31. A. Robinson, B. Vila-Vilaro, D. Axon, E. Perez, S. Wagner, **S.A. Baum**, C. Boisson, F. Durret, R. Gonzalez-Delgado, A. del Olmo, A. Pedlar, M.V. Penston, J. Perea, I. Perez-Fournon, J.M. Rodriguez-Espinosa, C. Tadhunter, R.J. Terlevech, S.W. Unger, M.J. Ward, “The Extended Narrow Line Region of NGC 4151. II. Spatial Variations of the Emission Line Intensities,” *Astronomy and Astrophysics*, 291, 351 (1994).
32. M. Kukula, A. Pedlar, S. Unger, **S.A. Baum**, and C.P. O’Dea, “8.4 GHz VLA Observations of the CFA Seyfert Sample,” *Astrophysics and Space Science*, 216 (1995).
33. C.P. O’Dea, J.F. Gallimore, **S.A. Baum**, “A High Spectral Resolution VLA Search for HI Absorption towards A496, A1795, A2584,” *Astronomical Journal*, 109, 26 (1995).
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**Table 1. Grants and Contracts 2004-2008, Stefi Alison Baum**

<b>PI/CO-I</b>	<b>Prime Sponsor</b>	<b>Title</b>	<b>Award Amount</b>	<b>Status</b>
PI	National Science Foundation(NSF)	NSF Research Experience For Undergraduates: Imaging in the Physics Sciences	389,774	Pending
PI	National Science Foundation(NSF)	Graduate Teaching Fellows in K-12 Education	1,749,296	Pending
PI	NYS Office of Science, Technology & Academic Research(NYSTAR)	Dr. Luke Lester and the Rochester Laboratory for Reconfigurable Nanosystems	500,000	Awarded, (not activated)
PI	National Aeronautics and Space Administration(NASA)	JWST/NIRCAM Project-Girl Scouts Activities (Year 3)	6,000	Awarded
Co-PI	National Aeronautics and Space Administration(NASA)	A Photon Counting Image Detector for NASA Missions	1,549,580	Pending
Co-PI	National Science Foundation(NSF)	Establishing the Foundation for Future Organizational Reform and Transformation	199,770	Awarded
Co-PI	National Aeronautics and Space Administration(NASA)	Constraining the Cold Gas and Dust in Cluster Cooling Flows	414,631	Awarded
Senior Personnel	National Aeronautics and Space Administration(NASA)	A Lidar Imaging Detector for NASA Planetary Missions	1,097,409	Awarded
Co-PI	National Aeronautics and Space Administration(NASA)	Towards a Complete Sample: 3CR	35,000	Awarded

		Extragalactic Radio Sources with $z < 0.3$		
Co-PI	National Aeronautics and Space Administration(NASA)	The Journey of a Photon: "High School Student Involvement in Developing Their Community's Understanding of Detector Science for the International Year of Astronomy/Year of Science (2009) and Beyond	44,986	Awarded
Co-PI	National Aeronautics and Space Administration(NASA)	HST FUV Observations of Brightest Cluster Galaxies: The Role of Star Formation in Cooling Flows and BCG Evolution	36,053	Awarded
PI	National Aeronautics and Space Administration(NASA)	JWST/NIRCAM Project-Girl Scout Activities (year 2)	6,000	Awarded
PI	US Department of Energy(DoE)	Mind Institute Fellowship	55,000	Awarded
Co-PI	National Aeronautics and Space Administration(NASA)	Resolving the Critical Ambiguities of the M-Sigma Relationship	201,497	Awarded
PI	National Aeronautics and Space Administration(NASA)	NRAO Junior Fellowship-Andrew Michael	50,268	Awarded
Co-PI	National Aeronautics and Space Administration(NASA)	A Census of Star Formation in the Brightest Cluster Galaxies: Is Star Formation the Ultimate Fate of the Cooling Gas?	86,054	Awarded
PI	National Aeronautics and Space Administration(NASA)	JWST?NIRCAM Project-Girl Scout Activities (addon)	4,000	Awarded, Now Closed
PI	National Aeronautics and Space Administration(NASA)	Black Holes and Gas Disks in a Complete Sample of Radio-Loud Ellipticals-II: Kinematics	10,068	Awarded

PI	National Aeronautics and Space Administration(NASA)	JWST/NIRCAM Project-Mod 2	131,794	Awarded
PI	National Aeronautics and Space Administration(NASA)	IRS Spectroscopy of 3CR Radio Galaxies	61,463	Awarded
PI	NYS Office of Science, Technology & Academic Research(NYSTAR)	Faculty Development Program: Recruitment of Donald Figer	727,935	Awarded
PI	National Aeronautics and Space Administration(NASA)	Ultraviolet Snapshots of 3CR Radio Galaxies HST 10606	45,758	Awarded
PI	National Aeronautics and Space Administration(NASA)	Summer Student to use Subpixel Repositioning (SER) techniques to Sharpen Chandra X-Ray Images	6,019	Awarded, Now Closed
PI	National Aeronautics and Space Administration(NASA)	Infrared Snapshots of 3cr Radio Galaxies	40,000	Awarded
PI	National Aeronautics and Space Administration(NASA)	James Webb Space Telescope(JWST) Near Infrared Camera(NIRCam) University of Arizona Project	125,060	Awarded

9/12/08

