

Eddie Baron

Senior Scientist

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Education:

1985 PhD in Physics, SUNY, Stony Brook

1983 M.A. in Physics, SUNY, Stony Brook

1980 B.A. *Summa Cum Laude* in Physics Honors, U. of Pennsylvania, Philadelphia

Academic Appointments:

2023–Present Senior Scientist, Planetary Science Institute

2023–Present Professor Emeritus, University of Oklahoma

2011–2023 George Lynn Cross Research Professor, University of Oklahoma

2016–2016 Acting Department Chair, University of Oklahoma

2001–2023 Professor, University of Oklahoma

1996–2001 Associate Professor, University of Oklahoma

1990–1996 Assistant Professor, University of Oklahoma

1987–1990 Research Associate, Dept. of Physics, SUNY, Stony Brook

1985–1987 Research Associate, Steward Observatory, University of Arizona

1980–1981 Assistant Scientist, California Institute of Technology

Visiting Academic Appointments:

2021 Affiliate Researcher, Dept. of Physics & Astronomy, GWU, Washington, DC

2018 AUFF Guest Researcher, Physics & Astronomy, Aarhus Univ., Aarhus, Denmark

07-2016 Visiting Faculty, CRD, Lawrence Berkeley Laboratory

2012 Visiting Scholar, Physics Dept., University of California, Berkeley, CA

2011 SFB-LEXI Fellow, Hamburger Sternwarte, Hamburg, Germany

2004–2012 Visiting/Guest Scientist, CRD, Lawrence Berkeley Laboratory

2004 Professeur Invité, LPNHE, CNRS-IN2P3, Univ. of Paris VII

1987–1991 Guest Scientist, Brookhaven National Laboratory

1983–1985 Guest Scientist, Lawrence Berkeley Laboratory

Honors and Awards:

2014 Most Inspiring Faculty, Student Athlete Advisory Committee, University of Oklahoma

2001 Regents Award for Research and Creative Activity, University of Oklahoma

1991 Junior Faculty Summer Research Fellow, University of Oklahoma

1981–1983 Graduate Council Fellowship, SUNY Stony Brook

1980 *Phi Beta Kappa*

Societies:

Fellow, American Physical Society
American Astronomical Society
International Astronomical Union

Professional:

2016–2019 Board of Governors, Astrophysical Research Corp

Community:

2017–2022 Board Member, Ecoviva
2023–Present President, National Park Seminary, Master Assoc.
2022–2023 Vice President, National Park Seminary, Master Assoc.

Graduate Students Supervised

- D. Page, Thesis Title: Neutron Star Cooling: Kaon Condensation and Nucleon Superfluidity, SUNY, Stony Brook, 1989. G. E. Brown was official advisor, Baron was closely involved. Current Position: Professor, Autonomous University of Mexico (UNAM), Mexico City.
- M. B. Aufderheide, Thesis Title: Studies in Nuclear Astrophysics of Type II Supernovae, SUNY, Stony Brook, 1990. G. E. Brown was the official advisor, Baron was closely involved. Current Position: Staff Scientist, Livermore National Laboratory
- Tim Young, University of Oklahoma, 1994. David Branch was official advisor, Baron was closely involved., Current Position: Associate Professor, University of North Dakota.
- Peter Nugent, University of Oklahoma, 1997. Thesis Title: Non Local Thermodynamic Spectrum Synthesis of Type Ia Supernovae. Nielsen Award 1997. Current Position: Division Deputy for Scientific Engagement, Lawrence Berkeley National Laboratory
- Jim Buell, University of Oklahoma, 1998. Richard Henry was official advisor, but Baron is closely involved. Current Position: Associate Professor, Alfred State College
- Eric Lentz, University of Oklahoma, 2001. Thesis Title: NLTE synthetic spectra and light curves of type Ia supernovae. Nielsen Award 2001. Current Position: Staff Scientist, Oak Ridge National Laboratory.
- Robert Mitchell, University of Oklahoma, 2001. Thesis Title: Determining the distance of SN 1987A with SEAM. Current Position: Associate Professor, St. Ambrose University
- Rollin Thomas, University of Oklahoma, 2003, David Branch was official advisor, Baron was closely involved. Nielsen Award 2003. Current Position: NERSC Data Scientist, LBNL, Berkeley, CA
- Dean Richardson, University of Oklahoma, 2004, David Branch was official advisor, Baron was closely involved. Current Position: Associate Professor, Xavier University.
- S. Bongard, University of Oklahoma, 2005 Thesis Title: Radiative transfer and Type Ia Supernovae spectra analysis in the context of Supernova Factory Current Position: DR1, University of Paris VI, Paris, France
- Darrin Casebeer, University of Oklahoma, 2006, Karen Leighly was official advisor, Baron was closely involved. Current Position: Engineer, Boeing Corp.
- Soma De, University of Oklahoma, 2010, Thesis Title: Time Dependent Radiative Transfer: Applications on Core Collapse Supernovae and Cosmic Recombination Current Position: Senior Scientist, Centane Corp, St. Louis, MO.
- Bobby Fleshman, University of Oklahoma, 2012, Thesis Title: Hot Electrons and Radial Diffusion in Saturn's Inner Magnetosphere: Modeling the Effects on Ion Chemistry, Current Position: Owner, McFleshman's Brewing Company, Racine, WI.

- Brian Friesen, University of Oklahoma, 2015, Thesis Title Spectrum Formation at Late Times in Type Ia Supernovae. Nielsen Award 2015, OU Dissertation Award in Science and Engineering 2016. Current Position: Staff, National Energy Research Supercomputer Center, LBL, Berkeley, CA.
- Jeremy Lusk, University of Oklahoma, 2018, Thesis Title: Bolometric Luminosities of Peculiar Type II-P Supernovae Current Position: Assistant Professor, University of Central Arkansas, Conway, AR.
- Malia Jenks, University of Oklahoma, 2019, Thesis Title: Various Topics in Type Ia Supernovae Current Position: Cybersecurity, Edward Jones
- Li Yang, University of Oklahoma, 2020, Thesis Title: Casimir Effect: Quantum Fluctuations and Thermal Fluctuations, Kim Milton (co-advisor) Current Position: Assistant. Prof., Nanchang University, China
- James M. DerKacy, University of Oklahoma, 2022, Thesis Title: Casimir Effect: Quantum Fluctuations and Thermal Fluctuations, Current Position: Postdoc, Virginia Tech
- Anthony Burrow, University of Oklahoma, 2024 (expected), Thesis Title: , Current Position: Data Scientist (expected)
- Sarah Stangl, University of Oklahoma, 2024 (expected), Thesis Title: , Current Position: Postdoc (expected), LANL

Master's Students Supervised

- Dean Richardson, University of Oklahoma, 2001, Thesis Title: A comparative study of supernova absolute-magnitude distributions and a look at two-filter K-corrections. Current Position: Dept Chair, Professor, Xavier University.
- Pedro Llanos, University of Oklahoma, 2005, Thesis Title: Spectra of Gamma-Ray Burst Afterglows. Current Position: Assistant Professor, Ambry Riddle University.
- Veselin Kostov, University of Oklahoma, 2005, Thesis Title: Stellar Atmosphere Models as Inputs for Stellar Evolution (Studies of Metallicities) Current Position: Research Associate, University of Toronto.

Capstone Students Supervised

- Darrin Casebeer 1998-1999
- Rick Yoesting 1998-1999
- Andrew Magness 1998-1999
- Anthony O'Dell 1999-2000
- Ben Williams 2004-2005

- Wesley Ketchum 2006-2007
- Michael Troxel 2006-2007
- Spencer James 2008-2010
- Brandon Doull 2009-2011
- Dustin Clause 2016
- Patrick Vallely 2014-2017
- Braden James 2015-2017
- C. Nadia Buckles 2016-2017
- Di Zhao 2016-2017
- London Willson 2018-2021
- John Griffin 2020-2020
- Kurtis Felker 2020-2020
- Zach Yarbrough 2020-2022
- Isaiah Washington 2022-2022

REU Students

- Since 1996, I have supervised forty-four REU student projects.

Talks and Seminars

Conference Talks

- “Collapse Calculations in Stars of Mass Less Than $15 M_{\odot}$,” Invited talk at Symposium in Honor of the 80th Birthday of H. A. Bethe, Ithaca, 1986.
- “The Prompt Supernova Mechanism,” Invited talk at Brookhaven Workshop on Supernovae, Sept, 1987.
- “Explosions in Type II Supernovae,” Contributed talk at Conference on the Big Bang, Active Galactic Nuclei, and Supernovae, Tokyo, March, 1988.
- “Type II Supernovae: How Do They Explode?,” Invited talk 3rd Conference on the Intersections Between Particle and Nuclear Physics, Rockford, ME, May, 1988.
- “Type II Supernovae,” Invited talk at Workshop on Particle Astrophysics: Forefront Experimental Issues, Berkeley, Dec, 1988.
- “Initial Models and the Prompt Mechanism of SN II,” Invited talk at 10th Santa Cruz Summer Workshop, Santa Cruz, June, 1989.
- “The Status of Stellar Collapse Calculations,” Invited talk at Michigan Workshop on Supernovae, Ann Arbor, April, 1990.
- “The Cooling of Neutron Stars,” Invited talk at Michigan Workshop on Supernovae, Ann Arbor, April, 1990.
- “Prompt Mechanism of Stellar Collapse,” Invited talk at Supernova Workshop at Institute for Nuclear Theory, Seattle, July, 1990.
- “Spectroscopy and Light Curves in Type Ib Supernovae,” Invited talk at Nuclear Astrophysics of Type II Supernovae, Seattle, Feb., 1992.
- “SN 1993J: One Year Later,” Invited talk *Physics of Supernovae*, in honor of Stirling Colgate, Franklin Institute, Philadelphia, PA, April 7, 1994.
- “NLTE Modeling of SNe Ia Near Maximum Light,” Invited talk *NATO ASI: Thermonuclear Supernovae*, Aiguablava, Spain, June, 1995.
- “Using Supernovae as Abundance Probes,” Invited talk at Nordic Symposium on Galaxy Evolution, NORDITA, Copenhagen, June, 1996.
- “Progress on Modeling the Spectra of Core Collapse Supernovae,” Invited talk *Supernova Explosions: Their Causes and Consequences*, ITP, Santa Barbara, Aug, 1997.
- “Searching for the Progenitors of Type Ia Supernovae,” Invited talk *Supernova Workshop*, ITP, Santa Barbara, Sep, 1997.

- “SNe Ia Light Curves and Spectra: Evolutionary Effects?”, Invited Talk *Type Ia Supernovae: Evolution and Cosmology* Univ. of Chicago, Oct., 1998.
- “Radiation Transport in Type Ia Supernovae: Current Status and Future Prospects, Invited Talk, “Workshop on Thermonuclear Supernovae”, European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*), Trento, Italy, July, 2000.
- “Parallelization Strategies for ALI Radiative Transfer in Moving Media”, Invited Talk at “Stellar Atmosphere Modeling”, Tübingen, Germany, March, 2002.
- “Highlights of Modeling Stellar Objects with PHOENIX”, Invited talk at IAU Symposium No. 210, Modelling of Stellar Atmospheres, Uppsala, Sweden, June, 2002.
- “An Introduction to the Spectral Fitting Expanding Atmosphere Method (SEAM)”, Talk at SNAP Collaboration Meeting, Berkeley, CA, March 29, 2003.
- “The SEAM Method of Using Type II Supernovae as Cosmological Beacons”, SNAP Science Meeting, LBL, Berkeley, CA, March 12, 2004.
- “Early Spectra of Supernovae”, Invited talk at 1604–2004: Supernovae as Cosmological Lighthouses, Padova, Italy, June 18, 2004.
- “Parameter Studies of SNe Ia”, Invited talk at INT Workshop on Type Ia Supernovae and Cosmology Aug 5, 2004.
- “Overview of Supernova Modeling with PHOENIX”, Invited talk at 5th Serbian Conference on Spectral Line Shapes in Astrophysics Vrsac, Serbia, June 06-10, 2005.
- “Spectral Modeling of SNe Ia Near Maximum Light: Probing the Characteristics of Hydro Models”, Invited talk at Supernova RTN meeting, Max-Planck Institut für Astrophysik, Garching, Germany, Sep. 14-17, 2005.
- “Spectral Modeling of Type II SN”, Invited talk at The Multicoloured Landscape of Compact Objects and Their Explosive Origins, Cefalu, Sicily, June 11-24, 2006.
- “SYNOW & PHOENIX”, Invited talk at The Type Ia Supernovae and Dark Energy Workshop, Chicago, IL, Sept 6-7, 2006.
- “Numerical Simulations of SNe Ia Explosions — The State of Art From The Viewpoint of a Spectroscopist”, Invited talk at Energetic Events in the Universe: From Physics to Cosmology, Marseille, France, June 26, 2007.
- “3D Radiative Transfer with PHOENIX”, Invited talk Recent Directions in Astrophysical Quantitative Spectroscopy and Radiation Hydrodynamics, Boulder, CO, March 31, 2009.
- “Hydrogen in Type Ib Supernovae”, Invited talk 4th Annual meeting of the Third Coast Astronomical Society: Probing the Dark Ages, Tallahassee, FL, May 20, 2010.

- “Hydrogen in Type Ib Supernovae”, Contributed talk Progenitors and environments of stellar explosions, Paris, France, June 28, 2010.
- “Generalized 3-D Radiative Transfer for Astrophysical Atmospheres”, Invited talk, Cool Stars 16, Aug 30, 2010.
- “An Overview of Quantitative Supernova Spectroscopy”, Northern Astrophysics Colloquium, Hamburg, Germany July 8, 2011.
- “SNe Ia Theory: The Explosion Zoo”, Invited Talk, SNe Ia Infrared Workshop, Pitt PACC, University of Pittsburgh, March 29, 2012.
- “The Melding”, Invited Talk/Discussion, SNe Ia Infrared Workshop, Pitt PACC, University of Pittsburgh, March 30, 2012.
- “A Physical Model for SN 2001ay”, Invited Talk, Cook’s Branch Meeting on Astronomy: Supernova Cosmology and Looking into the Future Montgomery, TX, April 13, 2012.
- “The PHOENIX/3D Suite: Current Capabilities and Future Directions”, contributed talk, Fifty One Ergs, North Carolina State University, Raleigh, NC, May 2013.
- “Late Time Spectral Models of SN 2011fe”, Invited talk at Carnegie Supernova Project II Workshop, Cook’s Branch, Montgomery, TX, October 5, 2013.
- “SNe Ia: Can Chandrasekhar Mass Explosions Reproduce the Observed Zoo?”, Invited talk, 45 Years of Nuclear Theory at Stony Brook: A Tribute to Gerry Brown, Stony Brook University, Stony Brook, NY Nov 25, 2013.
- “Galactic Archaeology with Cool Stars”, Invited Panel Member, at Cool Stars 18 in Flagstaff, AZ, USA from 9-13 June 2014.
- “Diversity in SNe Ia: Does It Require Diversity in the Progenitor Mass?” Invited talk, XX Anniversary of the Department of Astronomy of University of Guanajuato, Aug 14, 2014
- “Optical and Ultraviolet Spectral Analysis of SN 2011fe”, Invited talk at Carnegie Supernova Project II Workshop, Cook’s Branch, Montgomery, TX, April 14, 2016.
- “Nearby Supernova factory data and SNe Ia Physics”, Carnegie Supernova Project II Collaboration Meeting, Carnegie Observatory, Pasadena, CA, Nov 4, 2016.
- “Late Time Spectra of SN 2011fe”, Contributed paper, Supernovae Through the Ages Conference, Easter Island, Chile, Aug 11, 2016.
- “Don’t Know Much About: Kilonovae”, Talk at JWST ERS *Supernovae in the Dark Workshop*, Cook’s Branch, Montgomery, TX, April 26, 2017.

- “Preliminary Results of PHOENIX NLTE Spectra of Toy Kilonova Models”, Invited talk at INT Program INT-17-2b Electromagnetic Signatures of r-process Nucleosynthesis in Neutron Star Binary Mergers, Institute for Nuclear Theory, Univ. of Washington, Seattle, WA, Aug 2, 2017.
- “SuperBol” Carnegie Supernova Project II Collaboration Meeting, Carnegie Observatory, Pasadena, CA, Oct 27, 2017.
- “Modeling Si II lines in SN 2012fr”, Chris Cain & E. Baron Carnegie Supernova Project II Collaboration Meeting, Carnegie Observatory, Pasadena, CA, Oct 28, 2017.
- “SNe Ia Rad Tran with PHOENIX”, invited, SRitp workshop Radiation Transfer and Explosive Thermonuclear Burning in Supernovae, Weizmann Institute of Science, Rehovot, Israel, Jun 27, 2018.
- “Investigating Si II lines in SN 2012fr”, E. Baron & Chris Cain Carnegie Supernova Project II Collaboration Meeting, University of Hawaii, Honolulu, HI, CA, July 18, 2018.
- “Intro to Models of SNe Ia”, E. Baron Carnegie Supernova Project II Collaboration Meeting, St. George Island, FL, Feb 25, 2019.
- “What We Did at OU on our Summer Vacation”, E. Baron Carnegie Supernova Project II Collaboration Meeting, Carnegie Observatories, Pasadena, CA, Oct 11, 2019.

Seminars and Colloquia

- “Supernova 1987A,” Colloquium at Wake Forest Univ., May, 1989.
- “The Physics of Core Collapse Supernovae,” Colloquium at Univ. of Oklahoma, Feb., 1990.
- “Stellar Collapse: The Death of Massive Stars,” Colloquium at Kansas State Univ., April, 1991.
- “The Collapse of White Dwarfs to Neutron Stars,” Colloquium at Oklahoma State Univ., Sept., 1991.
- “Type Ib Supernovae: Production of Black Holes?,” Colloquium at Univ. of Kansas, Feb., 1993.
- “The Progenitor of SN 1984L,” Seminar at Ariz. State Univ., March, 1993.
- “SN 1993J: Another Unique Type II Supernova,” Seminar at Ariz. State Univ., Sept., 1993.

- “The Physics of SNe Ia and the Value of the Hubble Constant,” Colloquium at Ariz. State Univ., March, 1995.
- “NLTE Modeling of Supernovae,” Seminar at Stockholm Observatory, Saltsjöbaden, Sweden, Sept., 1995.
- “The Application of SNe Ia to Cosmology,” Colloquium at Rice Univ., Nov. 1995.
- “Searching for the Progenitors of Type Ia Supernovae,” Colloquium at University of Georgia Athens, GA, Oct., 1997.
- “Searching for the Progenitors of Type Ia Supernovae,” Colloquium at Southern Methodist University Dallas, TX, Feb., 1998.
- “Type Ic Supernovae and Gamma-Ray Bursts?,” Astronomy Seminar at Stockholm Observatory, Saltsjöbaden, Sweden, Oct., 1998.
- “Type Ic Supernovae and Gamma-Ray Bursts?,” Astronomy Seminar at University of Georgia, Feb., 1999
- “Type Ic Supernovae and Gamma-Ray Bursts?,” Colloquium at University of Michigan, Apr., 1999
- “Type Ia Supernovae as Cosmological Distance Indicators: or How I learned to stop worrying and love the bomb, ... er, Cosmological Constant,” Colloquium at Trinity University , Nov., 1999
- “Type II Supernovae as Cosmological Probes in the 21st Century” Seminar at Lawrence Berkeley National Laboratory, Mar., 2000
- “Type II Supernovae as Cosmological Probes in the 21st Century” Colloquium at Univ. of Padova, July, 2000.
- “Measuring Cosmological Parameters with Type II Supernovae: Calibration of SN 1987A” Center for Simulation Physics Seminar at University of Georgia, Dec., 2001.
- “Understanding Spectra of SNe Ia”, Seminar at ENS-Lyon, Lyon, France, Jan., 2002.
- “Understanding Spectra of SNe Ia”, Seminar at SUNY, Stony Brook May., 2002.
- “Supernovae as Cosmological Probes”, Colloquium at Oklahoma State University, Oct., 2002.
- “Highlights of Modeling Stellar Objects with PHOENIX”, Seminar at Los Alamos National Lab, T-Division, Los Alamos, NM, September 18, 2003.
- “Quantitative Supernova Spectroscopy: What Can It Do For You?”, INPA Seminar, LBL, Berkeley, CA, March 12, 2004.
- “SNe Ia Models and Observations: A Spectroscopist’s Point of View”, INPA Seminar, LBL, Berkeley, CA, May 18, 2007.

- “Numerical Simulations of SNe Ia Explosions — The Viewpoint of a Spectroscopist”, Seminar at the Hamburger Sternwarte, Hamburg, Germany, April 24, 2008.
- “Spectroscopy of SNe Ia for Cosmology”, Seminar at DOE Office of Science March 17, 2009.
- “Synthetic Spectroscopy: Understanding SNe Ia”, Seminar at Goddard Space Flight Center, Greenbelt, MD, March 19, 2009.
- “Supernovae as Cosmological Probes”, Seminar at University of Tulsa, Tulsa, OK, Apr 17, 2009.
- “On Using Type Ia Supernovae as Cosmological Probes”, Colloquium at Trieste Astronomical Observatory (INAF/OATS) and the Astronomy Unit of the Physics Dept. of the Trieste University (UNI/TS), April 27, 2011.
- GrK Lectures on Radiative Transfer, Hamburger Sternwarte, Hamburg, April–June, 2011 (7 lectures)
- “On Using Type Ia Supernovae as Cosmological Probes”, SFB Colloquium at DESY, Hamburg, Germany June 29, 2011.
- “Introduction to Radiative Transfer”, Summer School of Antarctic Astronomy, Chinese Academy of Sciences, Beijing, China, August, 2011.
- “Using Quantitative Spectroscopy to Understand Core Collapse Progenitor Systems”, Seminar at University of Basel, Basel, Switzerland, September, 2011.
- “Using the Observed Diversity of Type Ia Supernova to Understand the Physics of the Phenomenon”, Colloquium at Ohio University, Athens, OH, April, 2016.
- “Using Nearby Supernova factory data to shed light on SNe Ia Physics”, INPA Seminar, LBL, Berkeley, CA, July 21, 2016.
- “Radiative Transfer in Irradiated Binary Systems”, NERSC All-to-All Meeting, LBL, Berkeley, CA, July 24, 2016.
- “On the Progenitors of SNe Ia”, AUFF Workshop on Supernovae, Aarhus, Denmark, Oct 12, 2018.
- “Stellar Modelling with Phoenix/1D and Phoenix/3D”, SAC Seminar, Aarhus, Denmark, Nov 15, 2018.
- “Plateaus in SNe Ia”, Stockholm Supernova Group, Stockholm, Sweden, Dec 3, 2018.
- “SNe Ia Progenitors. Wait. What?”, Extreme Objects Working Group, Stockholm, Sweden, May 23, 2019.
- “What We Did At OU On Our Summer Vacation”, Carnegie Supernova Project II Collaboration Meeting, Pasadena, CA Oct 11, 2019.

- “Current Status of Infant Supernova NSF Proposal”, Carnegie Supernova Project II Collaboration Meeting, Virtual, Sep, 15 2020.
- “The Swastika: What Does It Mean In the US in 2021?”, University of Oklahoma, Department of Physics & Astronomy Colloquium, Norman, OK (Virtual), Feb 2, 2021.
- “Precision Observations of Infant Supernovae (POISE)”, Seminar at George Washington University, Washington, DC, November 2, 2021.
- “How We’ve Spent the First Half of the Pandemic: It ain’t over yet.”, Seminar at IN2P3, Univ. of Paris VI & VII, November 30, 2021.

Public Talks

- “Supernovae: Where We Come From and Where We Are Going”, University of Oklahoma, Friday Night at the Observatory, Oct., 2001.
- “Supernovae as Cosmological Probes”, Astronomy Club of Tulsa, Tulsa Community College, Tulsa, OK, May 16, 2008.
- “Supernovae as Cosmological Probes”, Astronomy Club of Oklahoma City, OKC Science Museum, OKC Sept 16, 2008.
- “Measuring the Universe with Supernovae”, International Year of Astronomy Public Talk, Sam Noble Museum of Natural History, Norman, OK, Sep 3, 2009.
- “Measuring the Universe with Supernovae”, Astronomy Club of Tulsa, Tulsa Community College, Tulsa, OK, Feb. 26, 2010.
- “Merging Neutron Stars: Multi-messenger Laboratories” Astronomy Club of Oklahoma City, OKC Science Museum, OKC Oct 13, 2017.
- “Why We Want to Measure the Properties of Type Ia Supernovae”, Stockholm University, Stockholm, Sweden, May 24, 2019.