Tuguldur Sukhbold

Center for Cosmology and AstroParticle Physics
Department of Astronomy, Department of Physics
Ohio State University
Columbus, Ohio, USA.

go.osu.edu/sukhbold
tuguldur.s@gmail.com
(520)-302-8009

Education

UC Santa Cruz, Ph.D. in Astronomy and Astrophysics — 2011 – 2016
Thesis adviser: Professor Stan Woosley

University of Arizona, B.Sci. in Astronomy — 2007 – 2011

Languages: English, Mongolian, and Russian

Research Interests and Expertise

My research interests are in theoretical and computational high–energy and time–domain astrophysics, covering topics from stellar evolution to supernovae. In particular, I have a keen interest in understanding the advanced stages of evolution in massive stars, their explosion mechanism, and the resulting transients, compact remnants and nucleosynthesis yields. I am also interested in the radiative transfer and progenitors of thermonuclear supernovae.

Current and Previous Positions

NASA Hubble Fellow
Ohio State University, Columbus, OH — 2018 – present

Center for Cosmology and AstroParticle Physics (CCAPP) Fellow
Ohio State University, Columbus, OH — 2016 – 2018

Teaching and Mentoring

Research Mentorship

John Bredall	– OSU graduate student, explosive nucleosynthesis in CCSN	2020 – present
Rachel Patton	– OSU graduate student, massive star Carbon-Oxygen core evolution	2018 – present
Patrick Vallely	– OSU graduate student, modeling transients	2017 – present
Carolyn Raithel	– U. of Arizona graduate student with F. Özel, compact object mass distributions	2017
Zeyana Musthafa	– high-school student mentored through Summer Internship Program at UCSC	2014

Teaching Assistant at UC Santa Cruz

AY220C	– massive stars and nucleosynthesis (graduate) by Prof. Stan Woosley	2015
AY12	– stellar evolution (undergraduate) by Prof. Stan Woosley	2014
AY2	– introductory astronomy (undergraduate) by Prof. Steven Vogt	2014

Professional Service

Referee — 2016 – present
– Journals: *ApJ, MNRAS, ApJL, A&A, Nature Astronomy*
– Proposals: *NSF, NASA-ATP, NASA-FINESST, NASA-ADAP*
– Book Chapters: *Springer (Reviews on Modern Astrophysics)*

Organization of Meetings and Seminars
– Midwest Workshop on Supernovae and Transients, Columbus, OH (Chair) — 2019
– CCAPP Seminar Series, Columbus, OH (Co-organizer) — 2018
– TeV Particle Astrophysics, Columbus, OH (Session Convener) — 2017
– Ohio State University Massive Stars & SN group (Organizer) — 2016 – present

References

Prof. Stan Woosley	– woosley@ucolick.org	*University of California Santa Cruz*
Prof. Todd Thompson	– thompson.1847@osu.edu	*Ohio State University*
Prof. Chris Kochanek	– kochanek.1@osu.edu	*Ohio State University*

Invited Colloquia, Seminars and Talks

Astronomy Colloquium	Steward Observatory / NOAO (upcoming)	2021
Compact Objects Seminar	Space Telescope Science Institute (upcoming)	2021
CITA Seminar	University of Toronto	2021
Astrophysics Seminar	Northwestern University	2021
Plenary Talk	American Physical Society	2020
Physics and Astronomy Colloquium	University of Oklahoma	2020
Hubble Fellows Symposium	Space Telescope Science Institute	2020
Theoretical Astrophysics Seminar	University of Florida	2020
Astronomy Colloquium	University of Washington	2020
Astronomy Colloquium	University of Maryland	2019
Langley Astrophysics Seminar	University of Pittsburgh	2019
Hubble Fellows Symposium	NASA Headquarters	2019
Astrophysics Seminar	Purdue University	2019
Theoretical Astrophysics Center Seminar	UC Berkeley	2019
Spring Symposium	Space Telescope Science Institute	2019
4^{th} Fifty-One Ergs	North Carolina State University	2019
Hubble Fellows Symposium	Space Telescope Science Institute	2019
Lunar Occultation Explorer Science Meeting	Johns Hopkins - Applied Physics Lab	2019
Astrophysics Seminar	University of Notre Dame	2019
Astronomy Colloquium	Carnegie Observatories	2018
Physics Seminar	Ohio University	2018
Giant Magellan Telescope Science Meeting	University of Hawaii	2018
Astrophysics Seminar	Oak Ridge National Laboratory	2018
Astrophysics Seminar	MIT	2018
Astrophysics Seminar	Michigan State University	2018
Black Hole Initiative Colloquium	Harvard University	2017
Astronomy Colloquium	Yale University	2017
Astronomy Colloquium	Ohio State University	2016
Astronomy Colloquium	SETI Institute	2016
Astrophysics Seminar	Los Alamos National Laboratory	2015
Astrophysics Seminar	Northwestern University	2015

Contributed Conference Talks

CraigFest (UT Austin, 2021, upcoming); Midwest Workshop on Supernovae and Transients (U.of Chicago, 2019); 3^{rd} Fifty One Ergs (Oregon State, 2017); JINA-CEE Frontiers in Nuclear Astrophysics (Michigan State, 2016); 2^{nd} Fifty One Ergs (North Carolina State, 2015); Stellar Hydrodynamics Workshop (LANL, 2013); Theoretical Astrophysics of Southern California (Caltech, 2010).

Awards and Scholarships

Hubble Fellowship (NASA, 2018); CCAPP Fellowship (Ohio State U., 2016)
Teaching Award (UC Santa Cruz, 2014); Graduate Student Researcher Award (UC Santa Cruz, 2012)
Arizona Astronomy Board Scholarship (U. of Arizona, 2009); Galileo Circle Scholarship (U. of Arizona, 2008)

Public Outreach and Volunteer Work

– Volunteer Developer for Ultrasound Image Processing Pipeline, Nationwide Children's Hospital	2020
– Panelist at the MNG Summit, a professional development event for young Mongols in the U.S.	2020
– Astronomy on Tap, Michigan State University.	2018
– Friends of Ohio State Astronomy and Astrophysics, Ohio State University.	2016 – 2018
– Ohio State Science Judge, Ohio Academy of Science.	2017
– Telescope for each high school in Mongolia, Office of Astronomy Development, IAU.	2015
– Inmate Education Project, UC Santa Cruz.	2014

Media Exposure

Quanta/WIRED (*2021*); Proceedings of the National Academy of Sciences (*2020*); Cosmos Magazine (*2016*); Sciences et Avenir (*2016*); IFL Science (*2016*); UCSC-Alumni Magazine (*2015*)

Publication List

26 Refereed Publications.
Total citations 1491, 1 first-author paper with 450+, 3 papers with 150+; 7 papers with 50+; h-index=16.

Currently In Preparation

"A More Realistic Supernova Feedback for Galaxy Simulations" 2021
Sukhbold, T. and Thompson, T.

"Nucleosynthesis in Stripped Helium Stars" 2021
Sukhbold, T. & Woosley, S.

First–Author/Significant Contributions

"The Impact of Black Hole Formation on Population Averaged Supernova Yields"
15. Griffith, E., **Sukhbold, T.** & Weinberg, D., et al. 2021
Submitted to ApJ.
arxiv:2103.09837

"Model Light Curves for Type Ib and Ic Supernovae"
14. Woosley, S., **Sukhbold, T.** & Kasen, D. 2021
Accepted to ApJ. (cited: 3)
arxiv:2009.06868

"Towards a Realistic Explosion Landscape for Binary Population Synthesis"
13. Patton, R. & **Sukhbold, T.** (Student paper) 2020
MNRAS. Vol. 499, Issue 2, p.2803-2816 (cited: 9)
ADS arxiv:2005.03055

"The Birth Function for Black Holes and Neutron Stars in Binaries"
12. Woosley, S., **Sukhbold, T.** & Janka, H-T. 2020
ApJ, Volume 896, Issue 1, id.56; corresponding author. (cited: 14)
ADS arxiv:2001.10492

"The Explosions of Helium Stars Evolved with Mass Loss"
11. Ertl, T., Woosley, S., **Sukhbold, T.** & Janka, H-T. 2020
ApJ, Volume 890, Issue 1, id.51 (cited: 50)
ADS arxiv:1910.01641

"Missing Red-Supergiants and Carbon Burning"
10. **Sukhbold, T.** & Adams, S. 2020
MNRAS, Vol. 492, Issue 2, p.2578-2587. (cited: 19)
ADS arxiv:1905.00474

"Properties of Type-Ia Supernova Light Curves"
9. **Sukhbold, T.** 2019
ApJ, Volume 874, Number 1, article id. 62, 7 pp. (cited: 4)
ADS arxiv:1805.03712

"Confronting Models of Massive Star Evolution and Explosions with Remnant Mass Measurements"
8. Raithel, C., **Sukhbold, T.,** Özel, F. (Student paper) 2018
ApJ, Vol. 856, Issue 1, article id. 35, 13 pp. (cited: 24)
ADS arxiv:1712.00021

"High Resolution Study of Presupernova Compactness"

7. **Sukhbold, T.,** Woosley, S., Heger, A. 2018
ApJ, Vol. 860, Issue 2, article id. 93, 22 pp. (cited: 88)
ADS arxiv:1710.03243

"Magnetar Powered Ordinary Type IIP Supernovae"

6. **Sukhbold, T.,** & Thompson, T 2017
MNRAS, Vol. 472, Issue 1, p.224-229. (cited: 18)
ADS arxiv:1704.06682

"The Most Luminous Supernovae"

5. **Sukhbold, T.,** & Woosley, S. 2016
ApJL, Vol. 820, Issue 2, article id. L38, 5 pp. (cited: 44)
ADS arxiv:1602.04865

"Core-collapse Supernovae from 9 to 120 Solar Masses based on Neutrino-driven Explosions"

4. **Sukhbold, T.,** Ertl, T., Woosley, S., Brown, J., and Janka, H.-T. 2016
ApJ, Vol. 821, Issue 1, article id. 38, 45 pp. (cited: 448)
ADS arxiv:1510.04643

"The Compactness of Presupernova Stellar Cores"

3. **Sukhbold, T.,** and Woosley, S. 2014
ApJ, Vol. 783, Issue 1, article id. 10, 20 pp. (cited: 151)
ADS arxiv:1311.6546

"Presupernova Structure of Massive Stars"

2. Meakin, C., **Sukhbold, T.,** Arnett, D. 2011
A&SS, Vol. 336, Issue 1, pp.123-128. (cited: 12)
ADS arxiv:1006.0513

"Periodic Variables and Gyrochronology in the Open Cluster NGC 2301"

1. **Sukhbold, T.,** and Howell, S. 2009
PASP, Vol. 121, Issue 885, pp. 1188-1204. (cited: 6)
ADS arxiv:0812.2013

Other Contributed Publications

"ASASSN-18am/SN 2018gk : An overly-luminous type II(b) supernova from a massive progenitor"

11. Bose, S., et al. (incl. **Sukhbold, T.**) 2020
Submitted to MNRAS. (cited: 2)
ADS arxiv:1905.02849

"Probing the Innermost Ejecta Layers in SNR KES 75: Implications for the SN Progenitor"

10. Temim, T., Slane, P., **Sukhbold, T.**, Koo, B.-C., Raymond, J. C., and Gelfand, J. D. 2019
ApJL, Vol. 878, Issue 1, article id. L19, 13 pp. (cited: 6)
ADS arxiv:1905.02849

"ASASSN-18tb: A Most Unusual Type Ia Supernova Observed by TESS and SALT"

9. Vallely, P., et al. (incl. **Sukhbold, T.**) 2019
MNRAS, Vol. 487, Issue 2, p.2372-2384. (cited: 22)
ADS arxiv:1903.08665

"The Highly Luminous Type Ibn Supernova ASASSN-14ms"

8. Vallely, P.J., Prieto, J.L., Stanek K.Z., Kochanek, C, **Sukhbold, T.**, et al. 2018
MNRAS, Vol. 475, Issue 2, p.2344-2354. (cited: 7)
ADS arxiv:1711.00862

"Emission Line Models for the Lowest-mass Core Collapse Supernovae. I: Case Study of a 9 $M_\odot$ One-dimensional Neutrino-driven Explosion"

7. Jerkstrand, A., Ertl, T., Janka, H.-T., Müller, E., **Sukhbold, T.**, Woosley, S. E. 2018
MNRAS, Vol. 475, Issue 1, p.277-305. (cited: 19)
ADS arxiv:1710.04508

"Integral Field Spectroscopy of Supernova Remnant 1E0102-7219 Reveals Fast-moving Hydrogen and Sulfur-rich Ejecta"

6. Seitenzahl, I., et al., incl. **Sukhbold, T.** 2018
ApJL, Vol. 853, Issue 2, article id. L32, 6 pp. (cited: 6)
ADS arxiv:1801.06289

"The GRB-SLSN Connection: Mis-aligned Magnetars, Weak Jet Emergence and Observational Signatures"

5. Margalit, B., Metzger, B., Thompson, T., Nicholl, M., **Sukhbold, T.** 2018
MNRAS, Vol. 475, Issue 2, p.2659-2674. (cited: 35)
ADS arxiv:1705.01103

"Magnetar-powered Supernovae in Two Dimensions. II. Broad-line Supernovae Ic"

4. Chen, K.-J., Moriya, T., Woosley, S., **Sukhbold, T.,** Whalen, D., et al. 2017
ApJ, Vol. 839, Issue 2, article id. 85, 11 pp. (cited: 13)
ADS arxiv:1706.06758

"Supernova Progenitors, Their Variability, and the Type IIP Supernova ASASSN-16qf in M66"

3. Kochanek, C. S., Fraser, M., Adams, S., **Sukhbold, T.,** Prieto, J. L., et al. 2017
MNRAS, Vol. 467, Issue 3, p.3347-3360. (cited: 27)
ADS arxiv:1609.00022

"Magnetar-powered Supernovae in Two Dimensions. I. Superluminous Supernovae"

2. Chen, K.-J., Woosley, S. and **Sukhbold, T.** 2016
ApJ, Vol. 832, Issue 1, article id. 73, 11 pp. (cited: 47)
ADS arxiv:1604.07989

"A Two-parameter Criterion for Classifying the Explodability of Massive Stars by the Neutrino-driven Mechanism"

1. Ertl T., Janka, H.-T., Woosley, S., **Sukhbold, T.,** and Ugliano, M. 2016
ApJ, Vol. 818, Issue 2, article id. 124, 23 pp. (cited: 196)
ADS arxiv:1503.07522

White Papers and Proceedings

"Ex Luna, Scientia: The Lunar Occultation eXplorer (LOX)"

1. Miller, R., et al. (incl. Sukhbold, T.) 2019
arxiv:1907.07005

"Catching Element Formation In The Act"

2. Fryer, C. L., et al. (incl. Sukhbold, T.) 2019
arxiv:1902.02915

"Near-Earth Supernova Explosions: Evidence, Implications, and Opportunities"

3. Fields, B. et al. (incl. Sukhbold, T.) 2019
arxiv:1903.04589

"MUSE Integral Field Observations of the Oxygen-rich SNR 1E 0102.2-7219"

4. Seitenzahl, I. et al. (incl. Sukhbold, T.) 2017
Proceedings of the IAU, IAU Symposium, Vol. 331, pp. 178-183

"A Progress Report on the Carbon Dominated Atmosphere White Dwarfs"

5. Dufour, P. et al. (incl. Sukhbold, T.) 2009
Journal of Physics: Conference Series, Vol. 172, Issue 1, id. 012012

"The Astronomical Observatory of the Land of Blue Skies"

6. Kolenberg, K. et al. (incl. Sukhbold, T.) 2008
Journal of Physics: Conference Series, Vol. 118, Issue 1, id. 012061