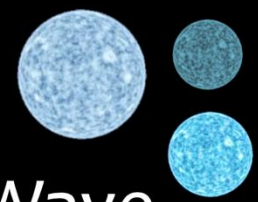
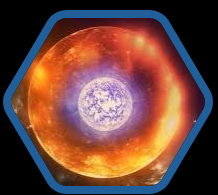


The Gravitational Wave Paleontology Lab



Floor Broekgaarden



Alex Migala



Sasha Lavina



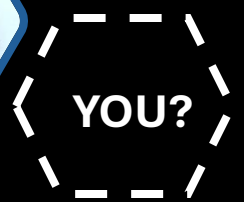
Amedeo Romagnolo



Ana Lam



Kyle Rocha



YOU?



Marko Ristic



Steffani Grondin



Caua Rodrigues



Khushi Karthikeyan



Jayanth Bharadwaj



Esther Park



Meera Desawale



Laya Binu



Kyle Kremer (A&A)



Shasha Arani



Javier Duarte (Physics)



Tyler Smith



Tom Wagg



Aobo Li (HDSI)



Adam Boesky



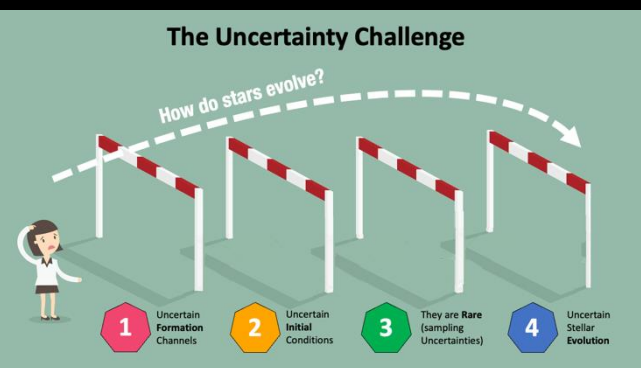
Andrea Zonca (SDSC)



Lucas de Sa

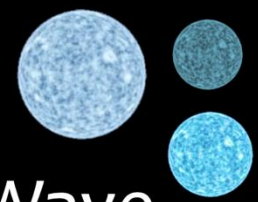


Christine Kirkpatrick (SDSC)

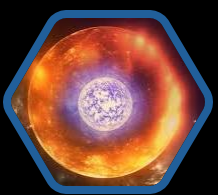


AI/ML Massive star evolution Astro-statistics
Computational Astro
transients
Gravitational waves Cosmic star formation history
Enrichment processes visualizations/data science
software

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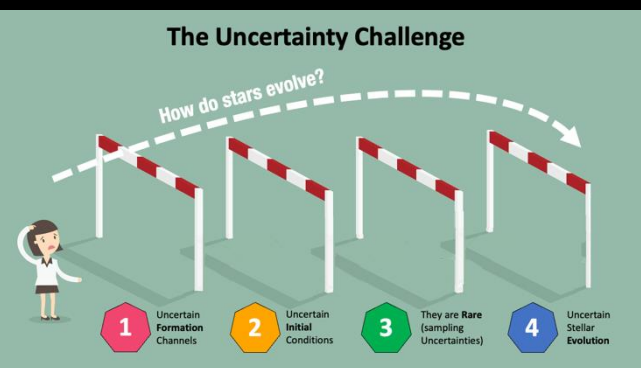
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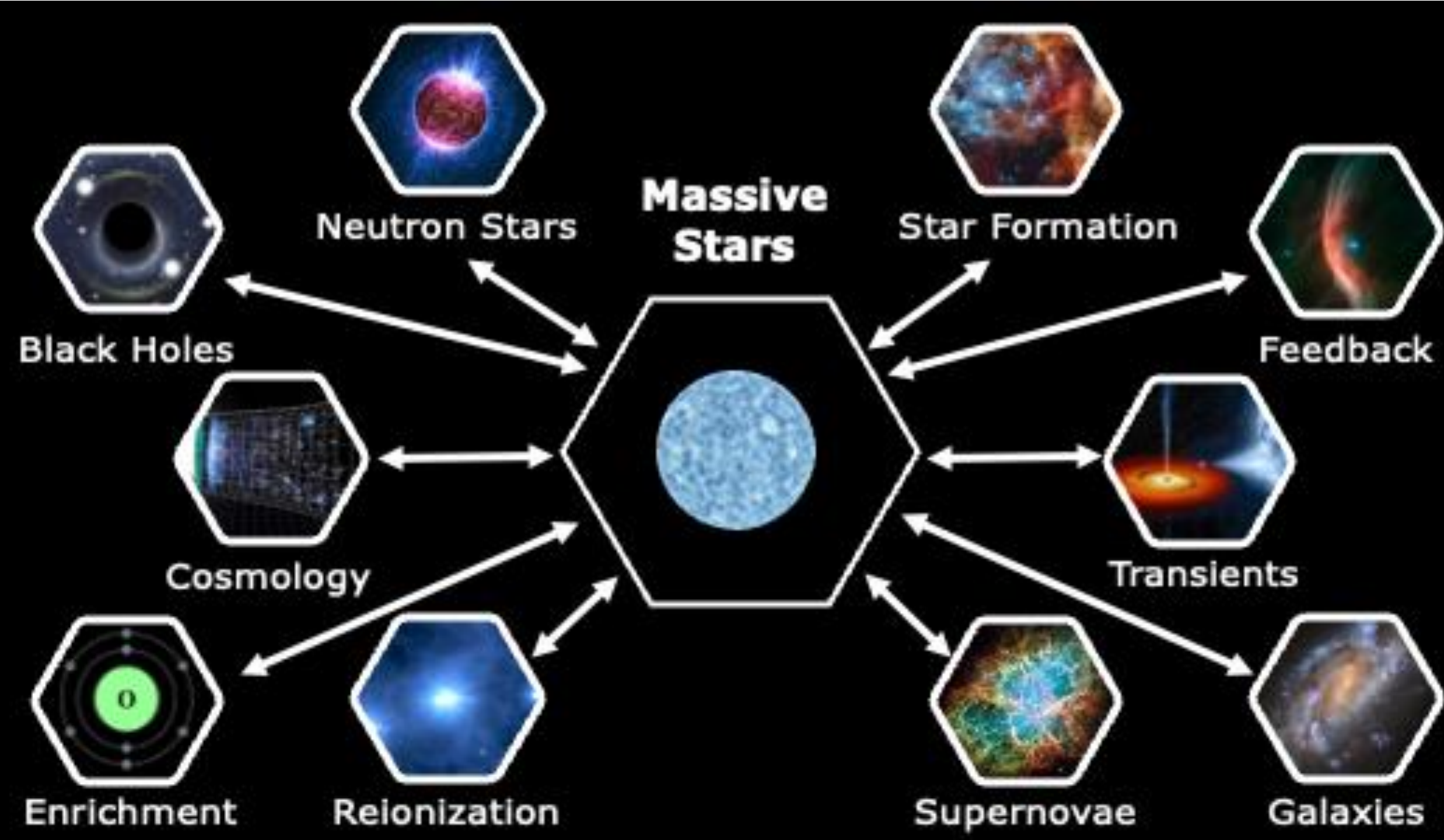
Lucas de Sa



Christine Kirkpatrick (SDSC)



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Possible Projects Example: GROWL catalog

How do we map/visualize high dimensional parameter spaces with >1000 simulations?

How do we quantify uncertainty?

How to decide where to simulate next?



Kyle Kremer
(A&A)

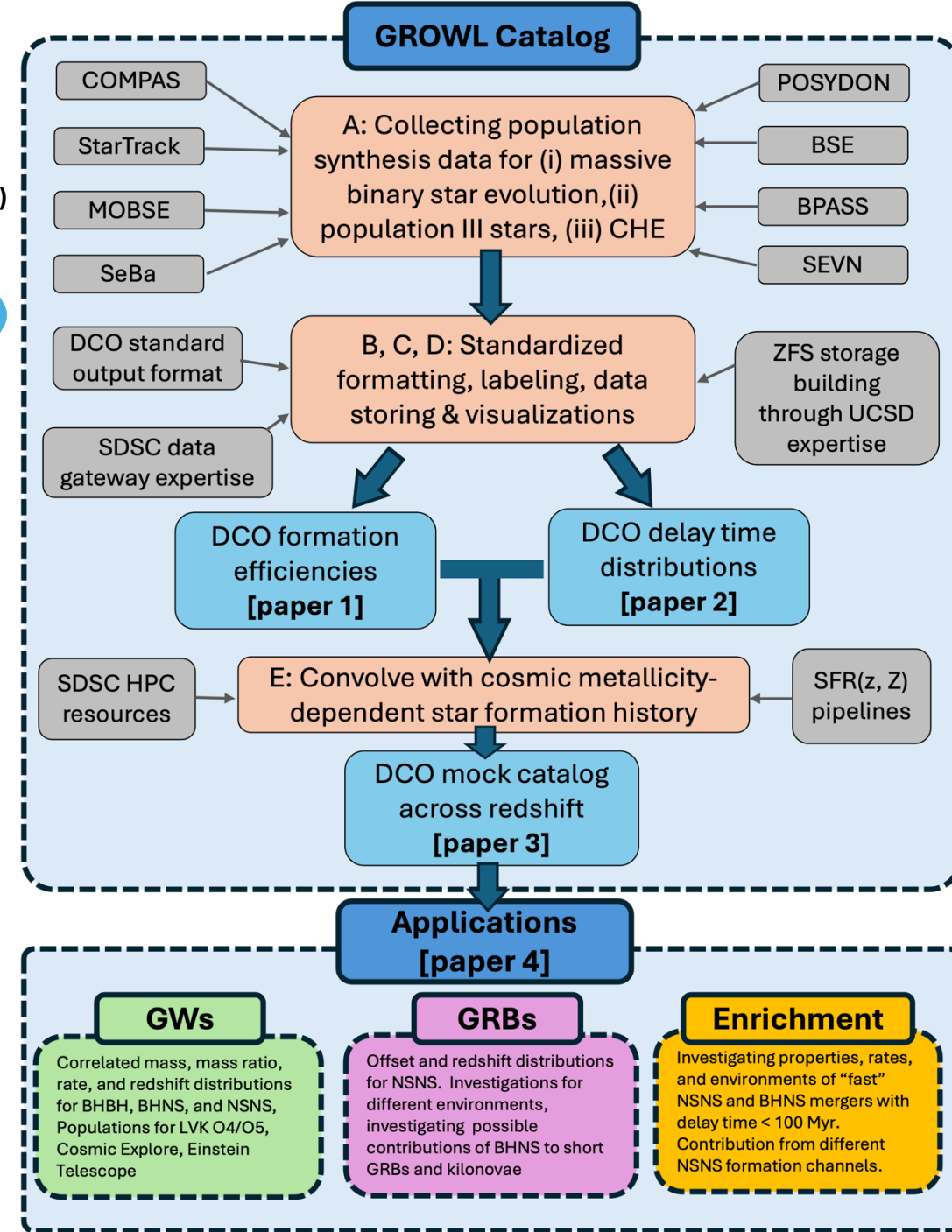
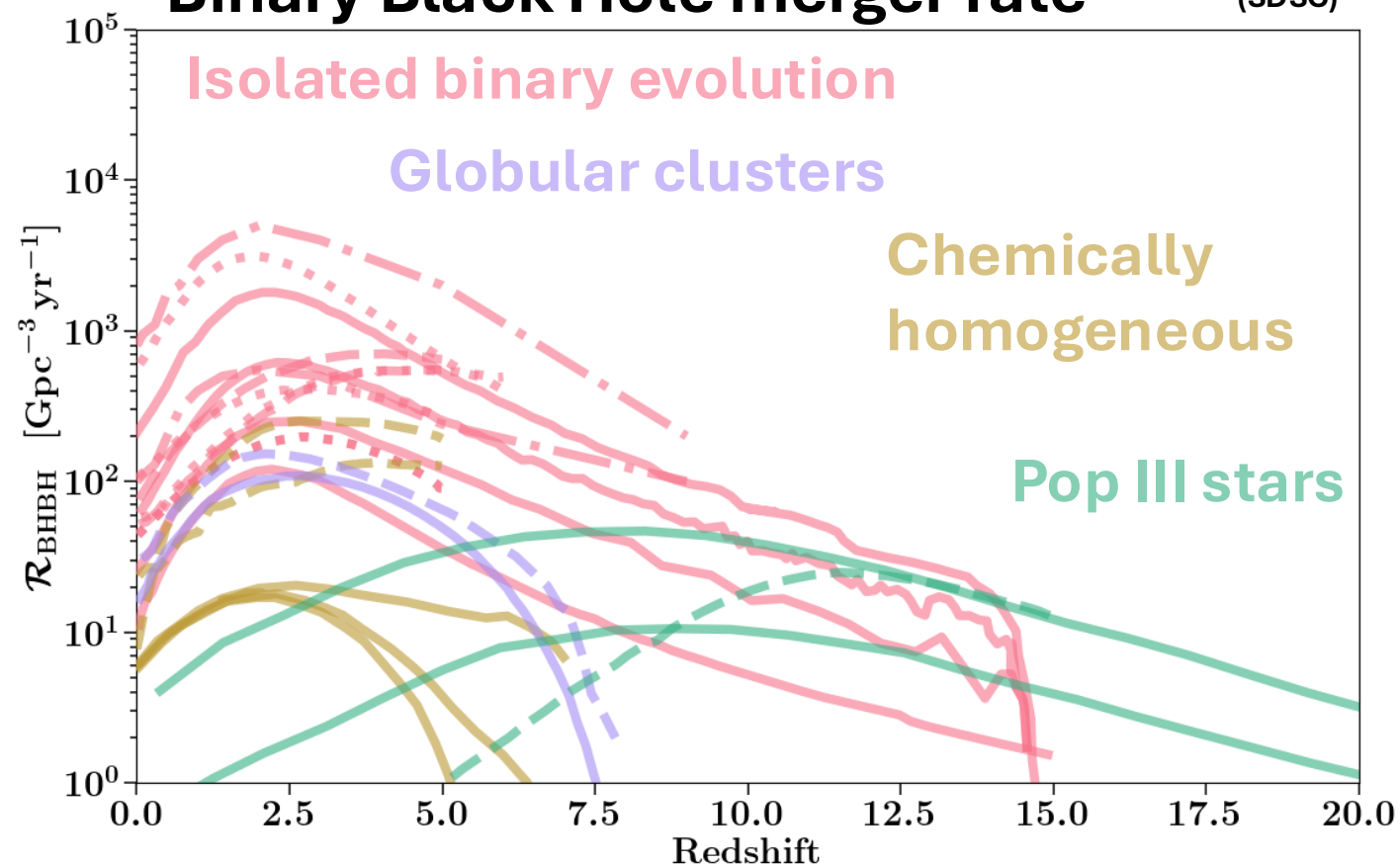


Aobo Li (HDSI)



Andrea Zonca
(SDSC)

Binary Black Hole merger rate



Understanding, Visualizing, & Quantifying intermediate stages of binary evolution



Ana Lam



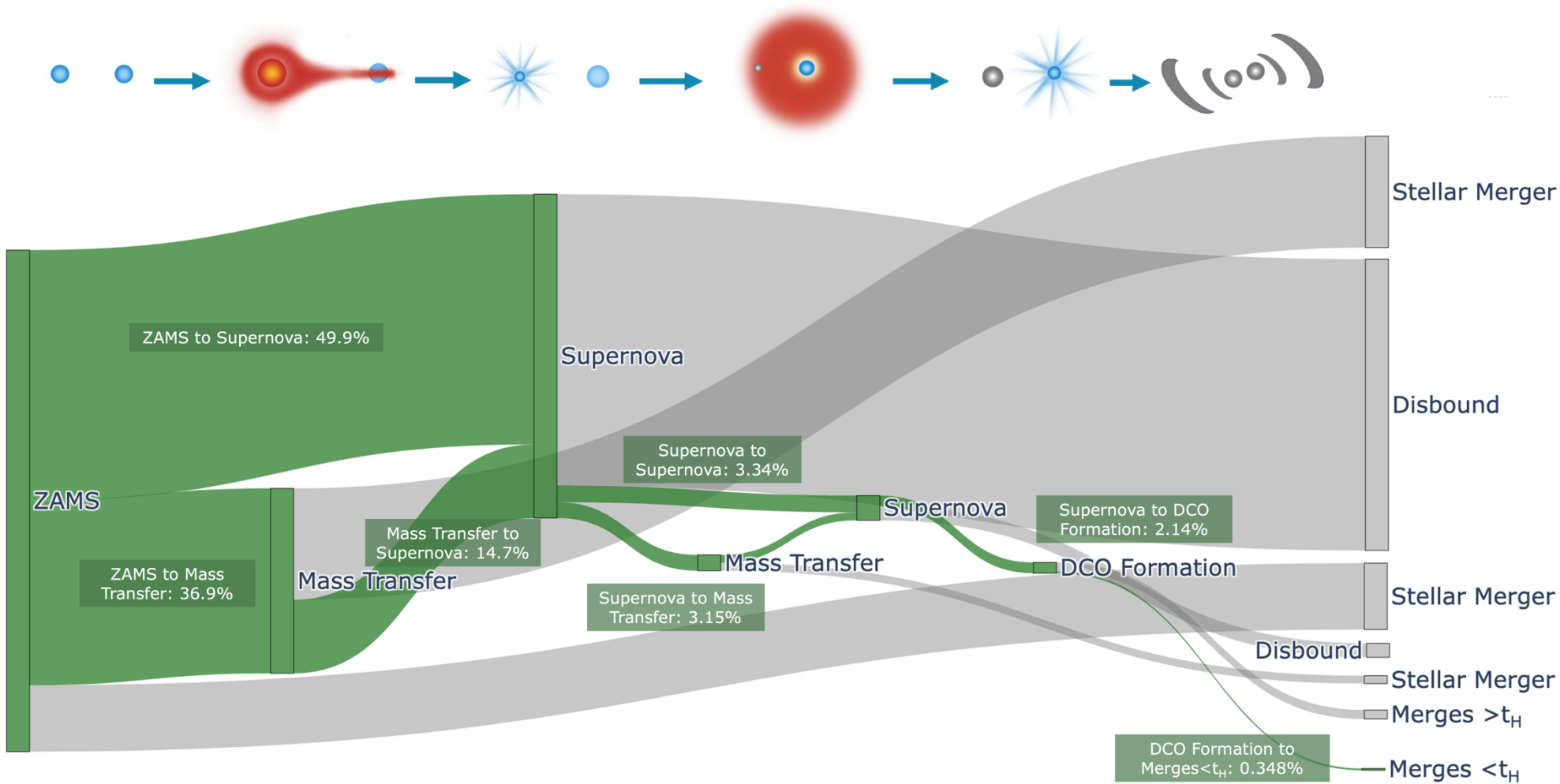
Steffani Grondin



Kyle Rocha



Tom Wagg



Funding opportunity:

The software citation station

- Work with interdisciplinary team for one year to make “the ADS for software”
- Develop software citation station (Java & Python) to improve support for software in Astronomy
- Tool will be used by journals & astronomers worldwide
- Lead interdisciplinary & international collaboration
- Organize & co-lead (SOC) NASA funded workshop on software citation in January 2026
- Present work at the ADACS conference in Germany



Javier Duarte
(Physics)



Andrea Zonca
(SDSC)



Tom Wagg
(CCA)



Peter Williams
(ADS/Harvard)



Daniel Katz
(U. Illinois / FAIR lead)

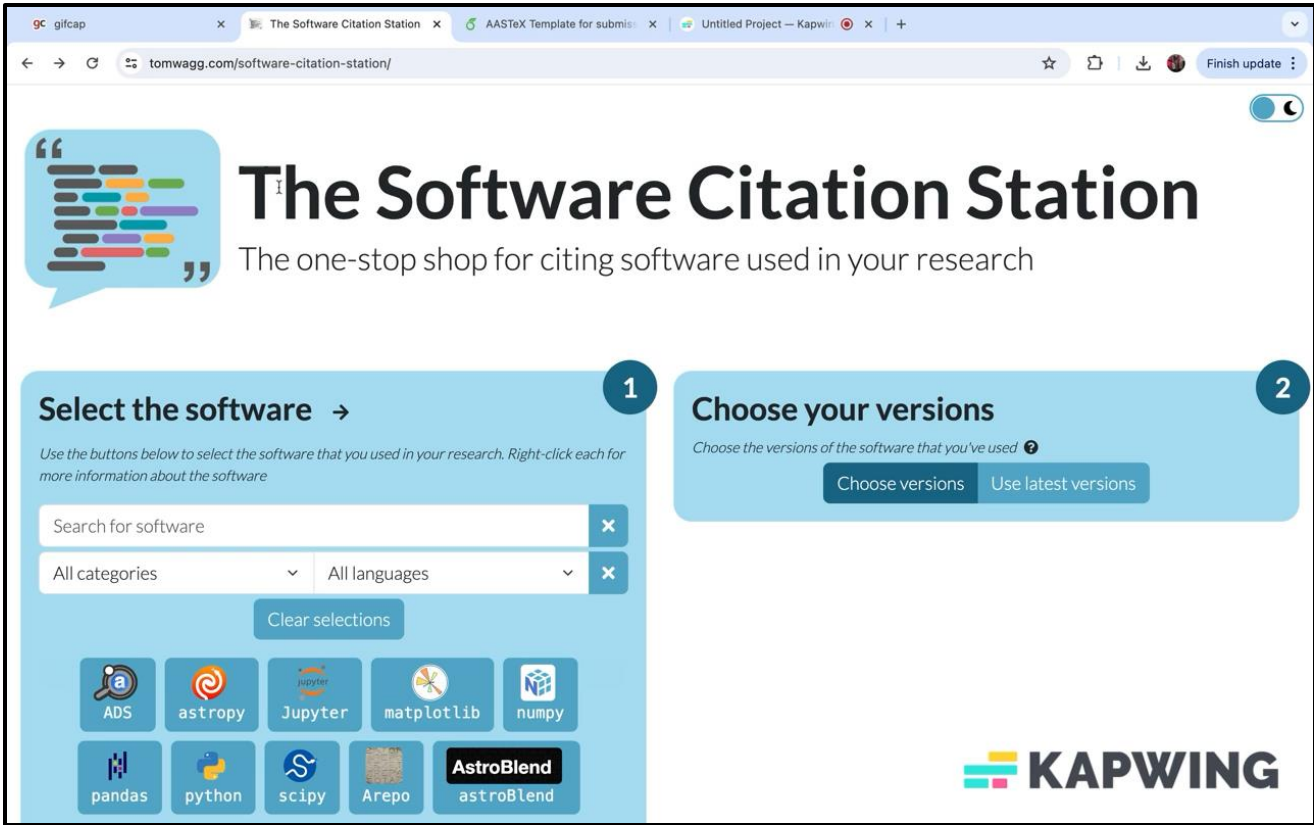


Christine Kirkpatrick
(SDSC)



Floor Broekgaarden

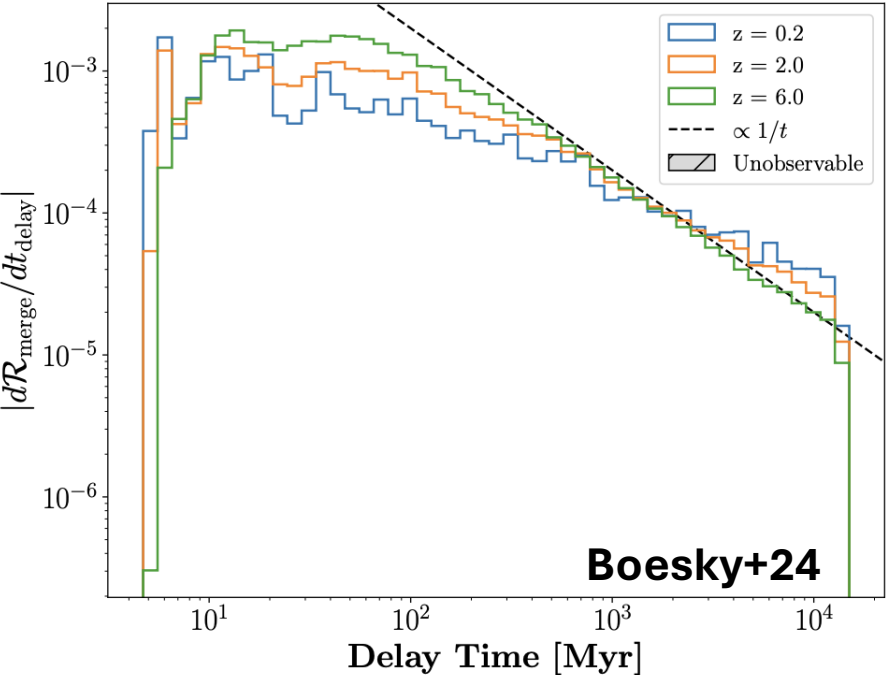
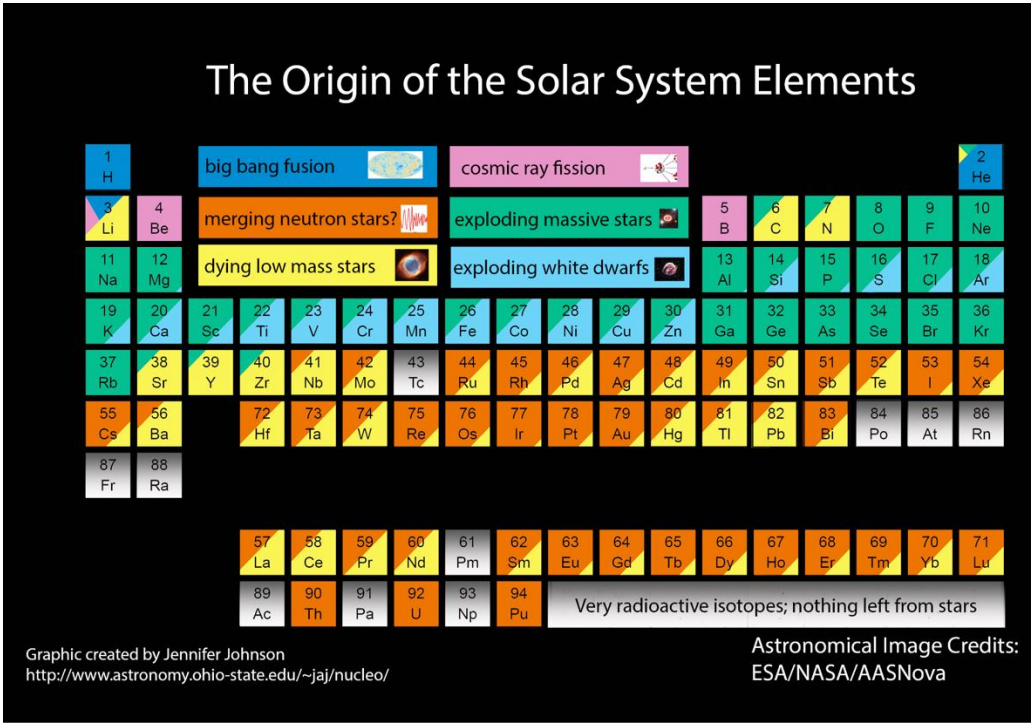
Tom Wagg & FSB (2024): to make citing software incredibly easy



Possible Projects Example: delay time distributions

Collaboration with Enrico Ramirez-Ruiz (UCSC), Alex Ji (Chicago), Yossef Zenati (JHU), Edo Berger (CfA), Wenfei-Fong (Northwestern), Griffin Hosseinzadeh (UCSD), Kyle Kremer (UCSD)

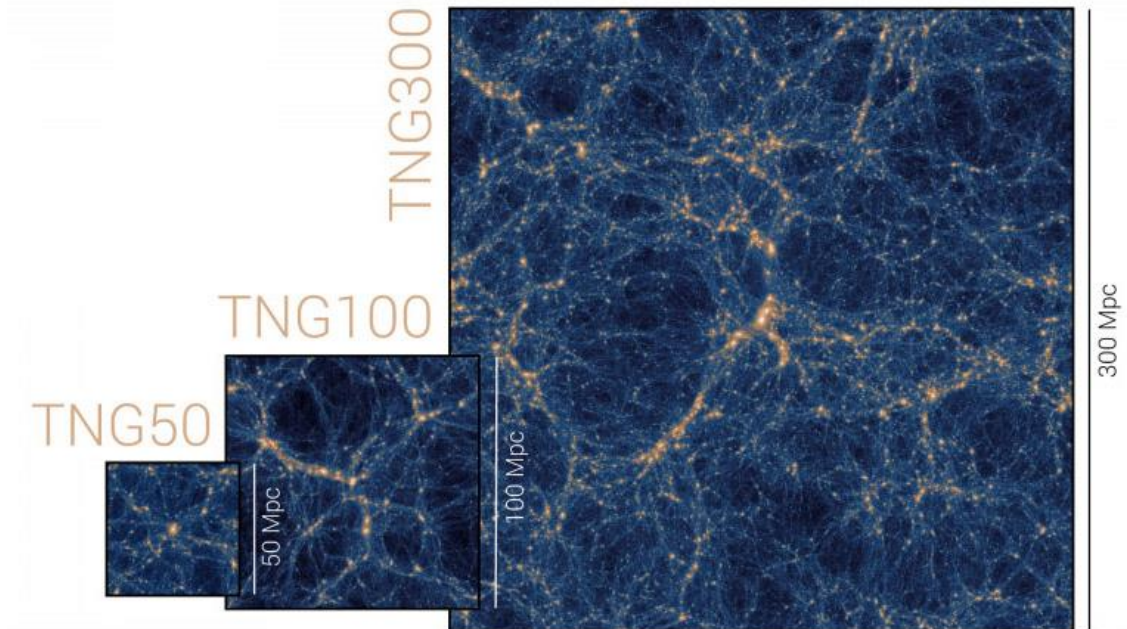
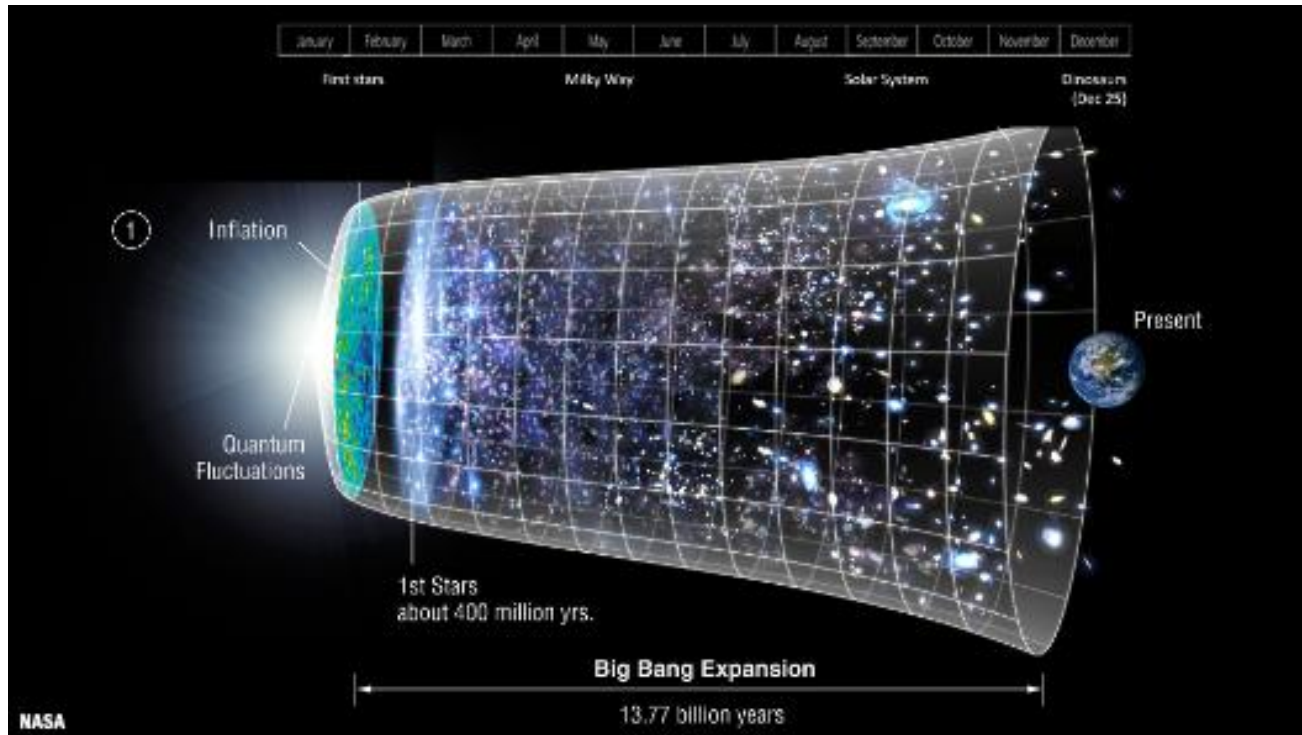
- How does binarity (mass transfer) impact the delay time distributions?
- What binary interactions can lead to fast-merging binary neutron stars?
- Can we explain (or understand) the different r-process enrichment observations (high/low redshift, high/low metallicity)
- How do different formation channels (dynamical, vs isolated vs AGN) lead to different delay times?
- Does the delay time distribution follow a t^{-1} distribution (which is often assumed?)



Possible Projects Example: studying star formation history & galaxy enrichment with WD/NS/BH mergers

- Type 1A rate versus NSNS versus BHNS rate
- Enrichment from mass transfer events & stellar winds
- Modeling the star formation history assumptions on this using IllustrisTNG
- Developing a model that will be used by the broader community
- Connecting this to Milky Way enrichment
- Investigating impact from metallicity on WD/NS/BH merger population

Collaboration with Enrico Ramirez-Ruiz (UCSC), COMPAS people, Ethan Nadler (UCSD), IllustriTNG Collaboration (CCA), Sasha Lavina (JHU), Lieke van Son (Nijmegen/CCA), Eric Burns (LSU), Dusan Keres (UCSD)



Collaborations / Activities:

- STRAND (Theory & Simulations AND more) meetings
- SMASH (San diego Meetings between Astro/physics SDSC, and HDSI
(with Physics, Astro, Data Science & supercomputer center)
- Gravitational Waves & Compact Objects Group (Kyle Kremer & Floor Broekgaarden)
- COMPAS: international collaboration on binary massive star evolution simulations.
Based in Melbourne.
- AstroAI: AI/ML center at the Center for Astrophysics (Harvard University)
- Data Science Collaboration Projects with SDSC & HDSI
- Software Citation Projects
- Early Career Astronomers (& Their Supporters) Events

Useful documents:

- Resources on my website such as how to pick a graduate school:
<https://t.co/LSNW09sQvh>
- My mentoring expectations document:
https://docs.google.com/document/d/1QGW6TzENWHwBjaXXYcUrwRB-80udnpOujCKvEbOWC6c/edit?usp=drive_link
- Possible PhD projects list:
<https://docs.google.com/document/d/1oBn-XJUDr9e-0QQ8mIx7OGELWSGrBEzpQM2BHNMQhJg/edit?usp=sharing>