



# Blending: Challenges from Images to Science

Intro: James Buchanan



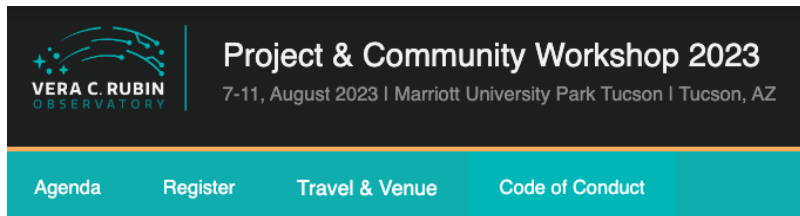
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# Reminder - Code of Conduct




Harassment and unprofessional conduct (including the use of offensive language) of any kind is not permitted at any time and should be reported to:

- Andrew Connolly ([ajc@astro.washington.edu](mailto:ajc@astro.washington.edu)),
- John Franklin Crenshaw ([jfc20@uw.edu](mailto:jfc20@uw.edu)), and/or
- Alysha Shugart ([ashugart@lsst.org](mailto:ashugart@lsst.org)).




full code of conduct


Rubin Observatory adheres to the principles of kindness, trust, respect, diversity, and inclusiveness in order to provide a learning environment that produces rigor and excellence.




Handshakes OK  
Fold Here



Elbow/Fist Bump OK  
Fold Here



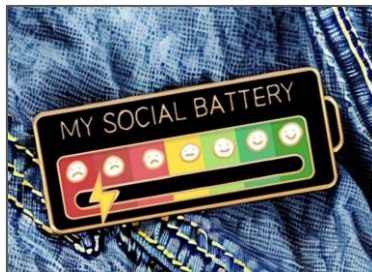
I Need My Space  
Fold Here



Wear a mask if you want to!

Check name-tags for these contact comfort level stickers.

Use the confidential email [rubin2023-covid@lists.lsst.org](mailto:rubin2023-covid@lists.lsst.org) to request a test, report your test results, or ask questions.



If someone is wearing a pin like this, and it indicates a low social battery, please give them their space or offer to restart the conversation at a later time.

**If you feel unsafe at any time send an email to [rubin2023-helpline@lists.lsst.org](mailto:rubin2023-helpline@lists.lsst.org)**

# Reminder - Virtual Participation



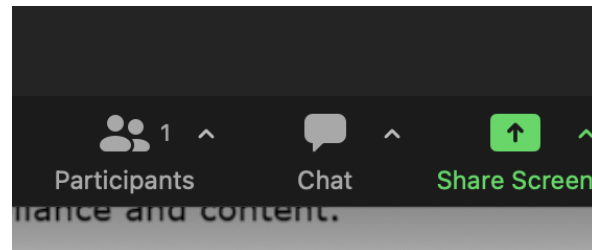
Virtual participants should be muted when they're not speaking.



In-person participants should speak into the room microphone(s), or the chair should repeat all questions into the microphone, so that the virtual participants can hear what is said.



In the Rubin2023\_PCW Slack Space, all participants can use the session's channel for Q&A and discussion. The channel name convention is, e.g.: #day1-mon-slot3a-intro-to-rubin



In Zoom, use the chat to:

- request to unmute to ask a question, or
- type your question so someone can speak it aloud.

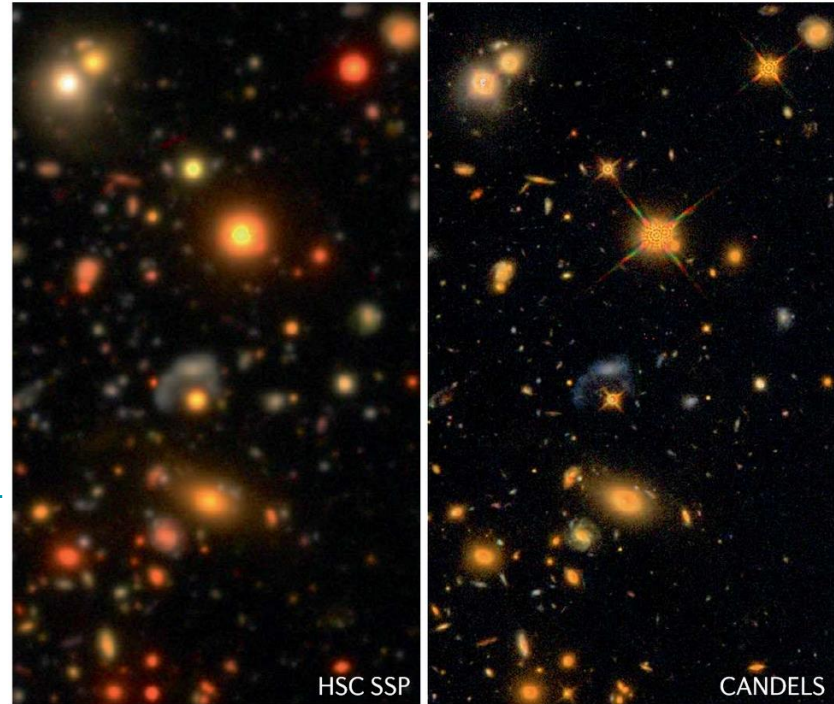
The Zoom “raise hand” feature is generally harder for moderators to track, and is not preferred, but may be used at the discretion of the session chair.

# Blending

Blending: when light from multiple distinct galaxies happens to overlap along Rubin's line of sight

Exacerbated by the atmospheric point spread function

Image:  
[Melchior et al. 2021](#)



# Blending

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*Everything* is technically blended. Some blends are worse than others.

Usually when people say “blended”, they mean *significant* blends, according to some definition of “significant”:

- when the number of galaxies is miscounted
- when non-deblended measurements are biased
- when even deblended measurements are highly uncertain

For more of an introduction, see my talk from [last year's PCW](#)

# Blending Working Group

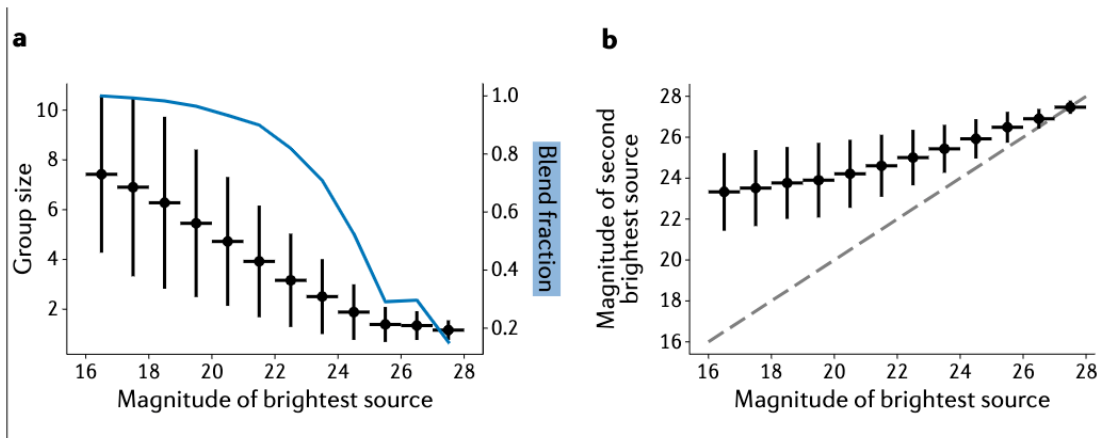
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Get in touch with the DESC Blending Working Group!

- Co-conveners: Me (buchanan11@llnl.gov) and Cyrille Doux
- LSSTC Slack: #desc-blending
- [DESC Confluence page](#)

# Blending vs. Magnitude

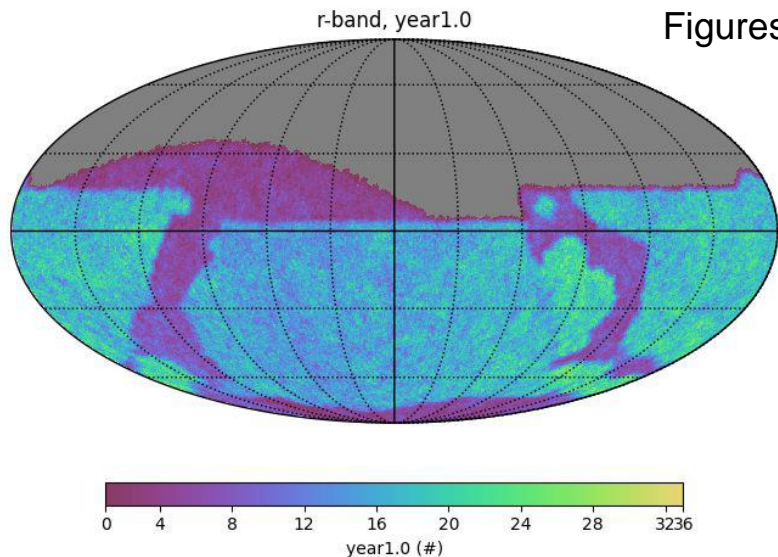
The frequency+severity of blending depends on galaxy brightness



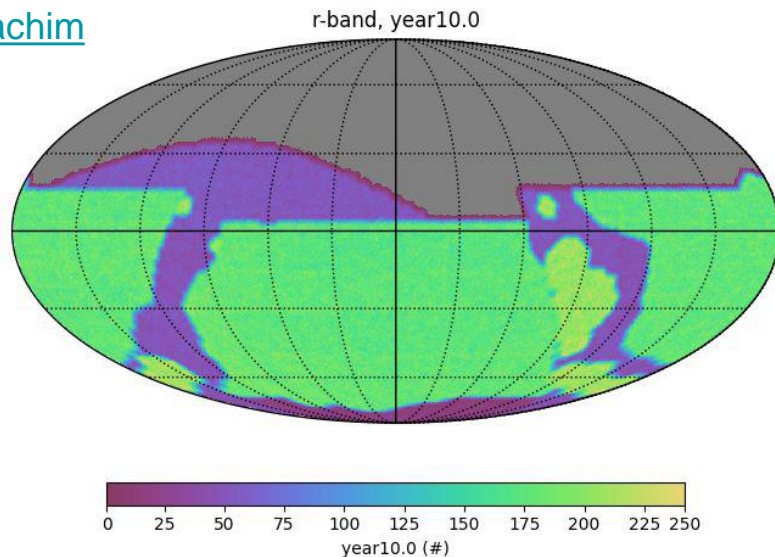
Figures:  
[Melchior et al 2021](#)

# Survey depth

The frequency+severity of blending depends on *survey depth*



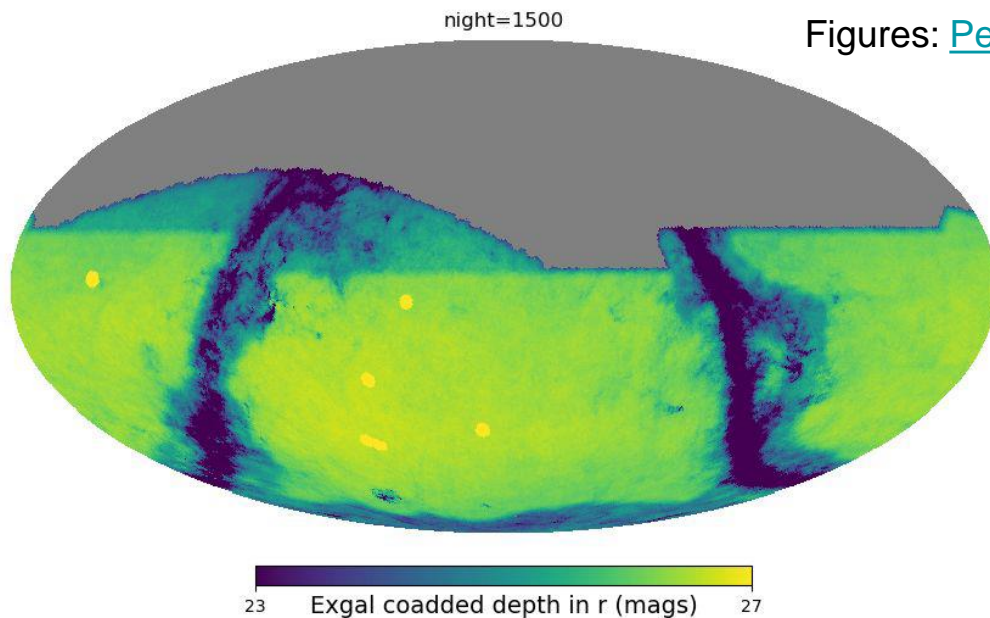
Figures: [Peter Yoachim](#)



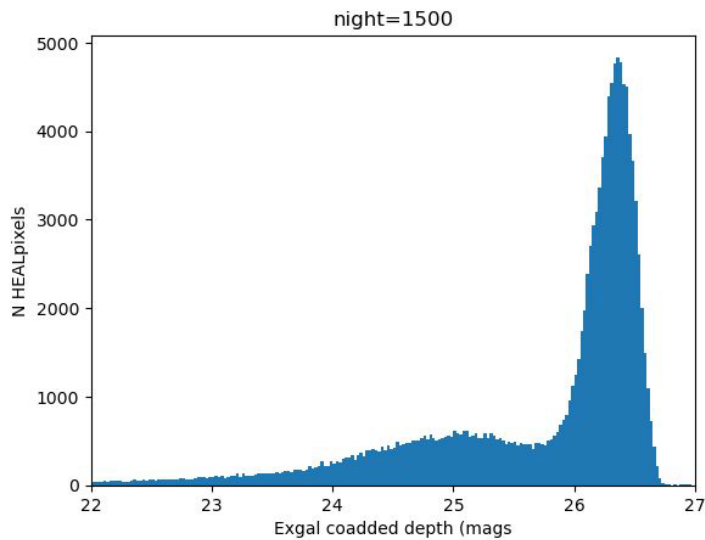


# Survey depth

The frequency+severity of blending depends on survey depth  
The coadded depth will vary over the survey footprint



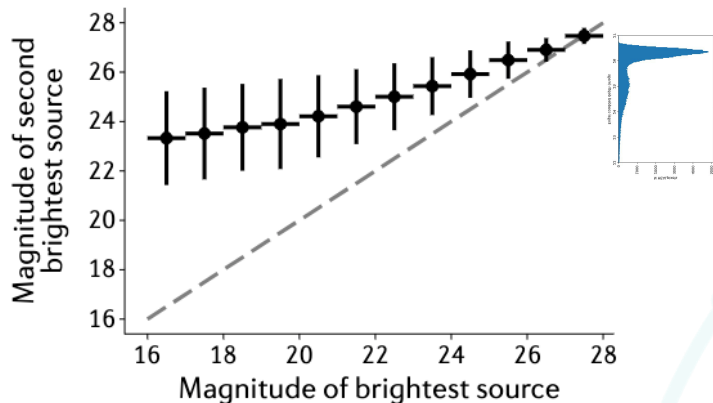
Figures: [Peter Yoachim](#)



# Survey depth

Changing depth means that:

- Number of detected objects changes



- S/N from each detected object changes
- Background light from non-detected objects changes

# Survey depth

Increased depth variation in DRs  
with significant rolling cadence impacts  
(~every other year)

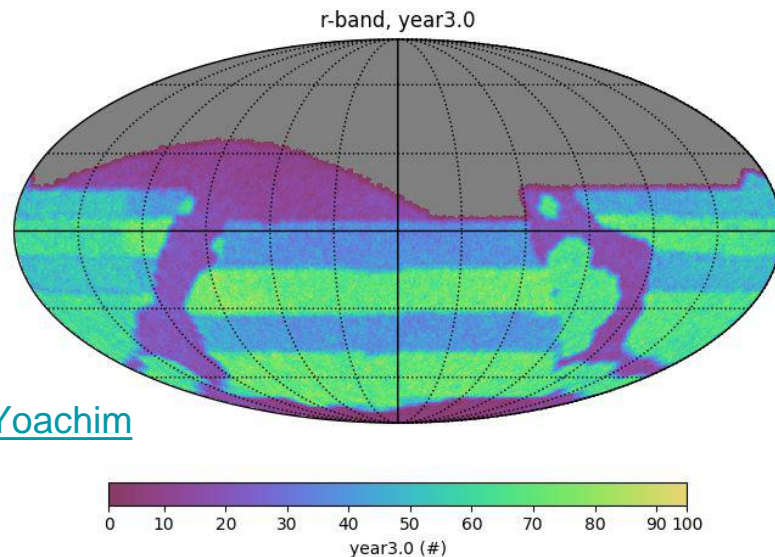


Figure: [Peter Yoachim](#)

Call to arms: Study the impact of survey non-uniformity on blending