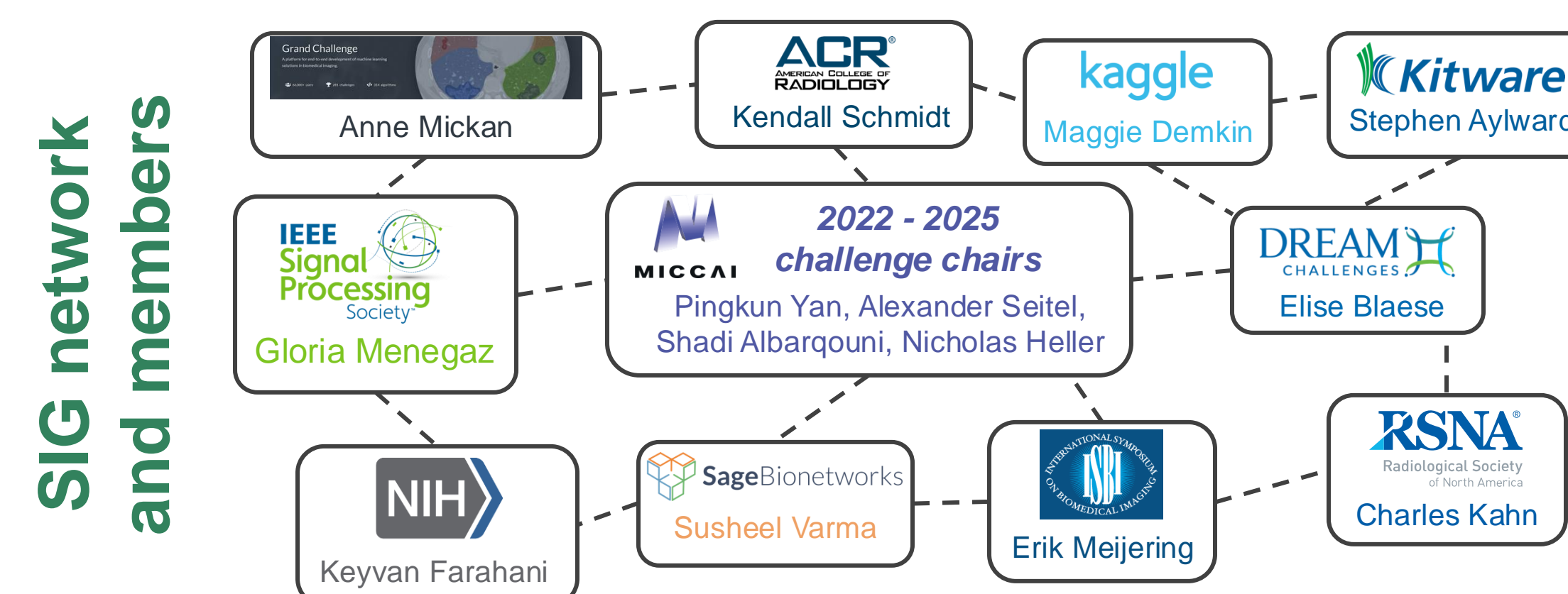# MICCAI 2024 Marrakesh MOROCCO

MICCAI Special Interest Group for Biomedical Image Analysis Challenges (SIG-BIAC)

Team

SIG Board

- Lena Maier-Hein (President)
- Annika Reinke (Secretary)
- Spyridon Bakas (Treasurer)
- Anne Martel
- Bennett Landman
- Michal Kozubek
- Nicholas Heller
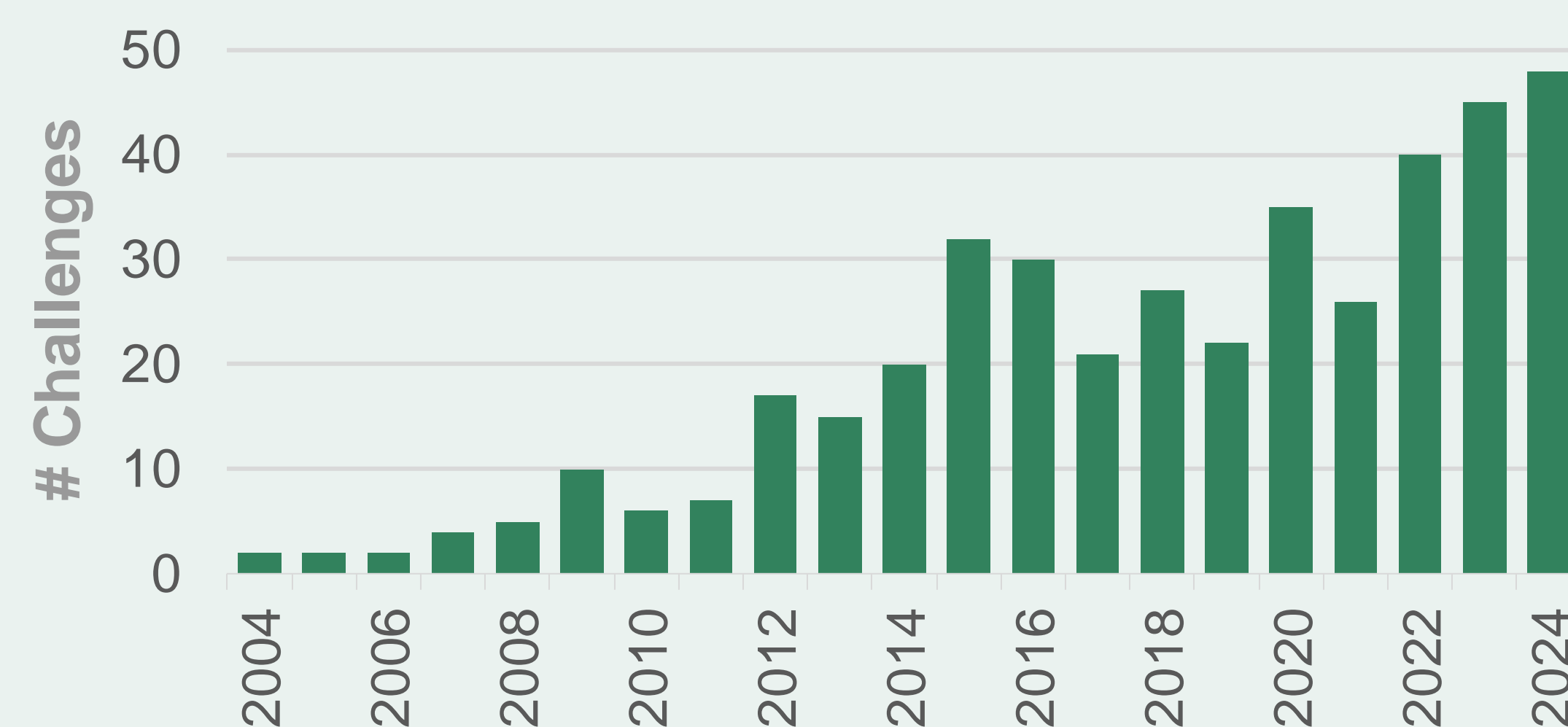- Annette Kopp-Schneider (Statistical Advisor)

SIG network and members

- Anne Mickan
- ACR RADIOLOGY — Kendall Schmidt
- kaggle — Maggie Demkin
- Kitware — Stephen Aylward
- IEEE Signal Processing Society — Gloria Menegaz
- MICCAI 2022 - 2025 challenge chairs — Pingkun Yan, Alexander Seitel, Shadi Albarqouni, Nicholas Heller
- DREAM CHALLENGES — Elise Blaese
- NIH — Keyvan Farahani
- SageBionetworks — Susheel Varma
- Erik Meijering
- RSNA Radiological Society of North America — Charles Kahn

SIG Mission

<u>Best practices for the MICCAI community</u>: The SIG aims to **build consensus regarding standards and best practices** by fostering inclusively and integrating the expertise of the international SIG-specific laboratories in academia and industry. This has the potential to **lead to better quality, reproducibility, interpretability, and transparency of benchmarking studies**.

<u>Leading role in method benchmarking</u>: Major machine learning conferences are increasingly attracting submissions from MICCAI, but credible benchmarking practices require domain expertise. The **MICCAI society uniquely positioned to become the leading organization with respect to systematic benchmarking of biomedical image analysis algorithms**.

<u>Assistance in challenge-related aspects</u>: The SIG will **assist MICCAI in handling challenge-related aspects**, such as the review of applications for challenge organization or endorsement.

The number of challenges per year is increasingly rising, reflecting their high impact: challenges drive the research field with new datasets and by producing new state-of-the-art methods.

Get involved!

Do you have an idea for a webinar? Want to change challenge practice? Contact us!
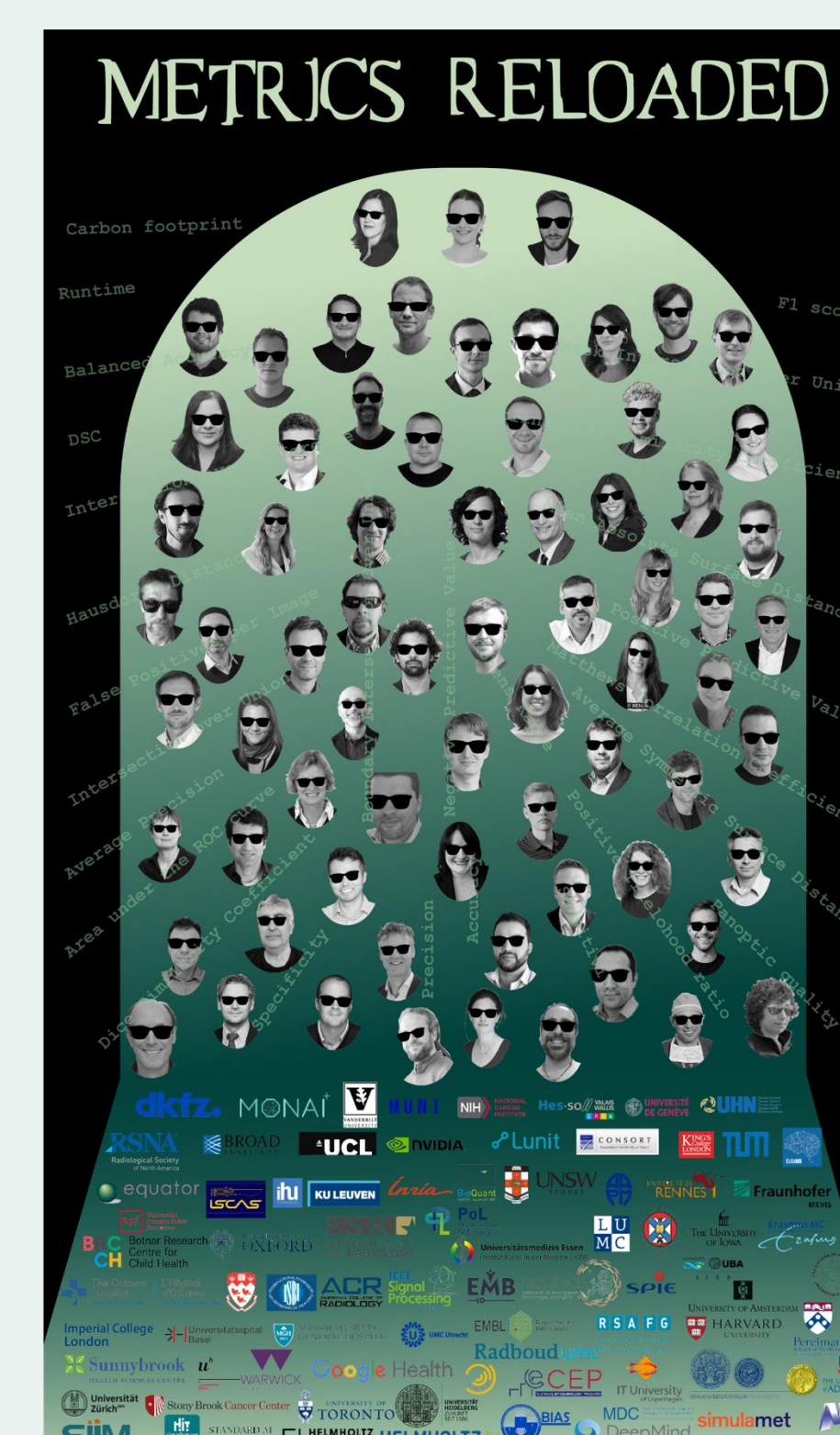*miccai-board-challenge-wg@dkfz-heidelberg.de*

Do you have specific feedback on challenges? Use our anonymous feedback survey.

Science

- **Metrics Reloaded: Recommendation framework** guiding researchers in the problem-aware selection of metrics
- **Study on 80 challenges** investigating **winning solution characteristics** and **common participation strategies**
- **Advanced visualization and results interpretation** for challenge and benchmarking results
- **Comprehensive** common point of access to information on **metric-related pitfalls**
- **Reporting guideline** for transparent and complete reporting challenges
- First comprehensive study **highlighting severe issues in challenges**

Ongoing initiatives

- Metrics Reloaded: image reconstruction and image synthesis
- Metrics Reloaded: surgery
- Data sharing and licensing practices in challenges
- Are we putting false claims when using bold-faced numbers in results tables?

METRICS RELOADED

Education

Webinars

Our webinar series aims to educate researchers on how to successfully participate in and conduct challenges, focusing on quality control and validation.

Past webinars

- How to **win** a challenge
- How to **run** a challenge
- **Metrics Reloaded:** From segmentation to calibration

Planned webinars

Starting early 2025: Data-centric webinars (academia/industry/regulatory perspectives; federated approach)

Online toolkits

To make our science easily accessible and usable, we have converted the theory into web toolkits free to use!

- **Metrics Reloaded:** A framework for trustworthy image analysis validation
- **Rankings Reloaded:** A toolkit for visualizing benchmarking results

Infrastructure

Structured challenge review system

To enforce compliance to the reporting guideline, a peer review process for challenges was developed through a structured challenge submission system introducing standardized challenge designs.

Challenge registration

Inspired by clinical trials, the concept of challenge registration requires challenge designs to be uploaded and updated transparently before execution, reducing the risk of manipulation.

Lighthouse challenges initiative

The SIG introduced "lighthouse challenges" to highlight high-impact, best-practice challenges undergoing stricter review and meeting specific criteria, including multi-centered data, and docker-based submissions.