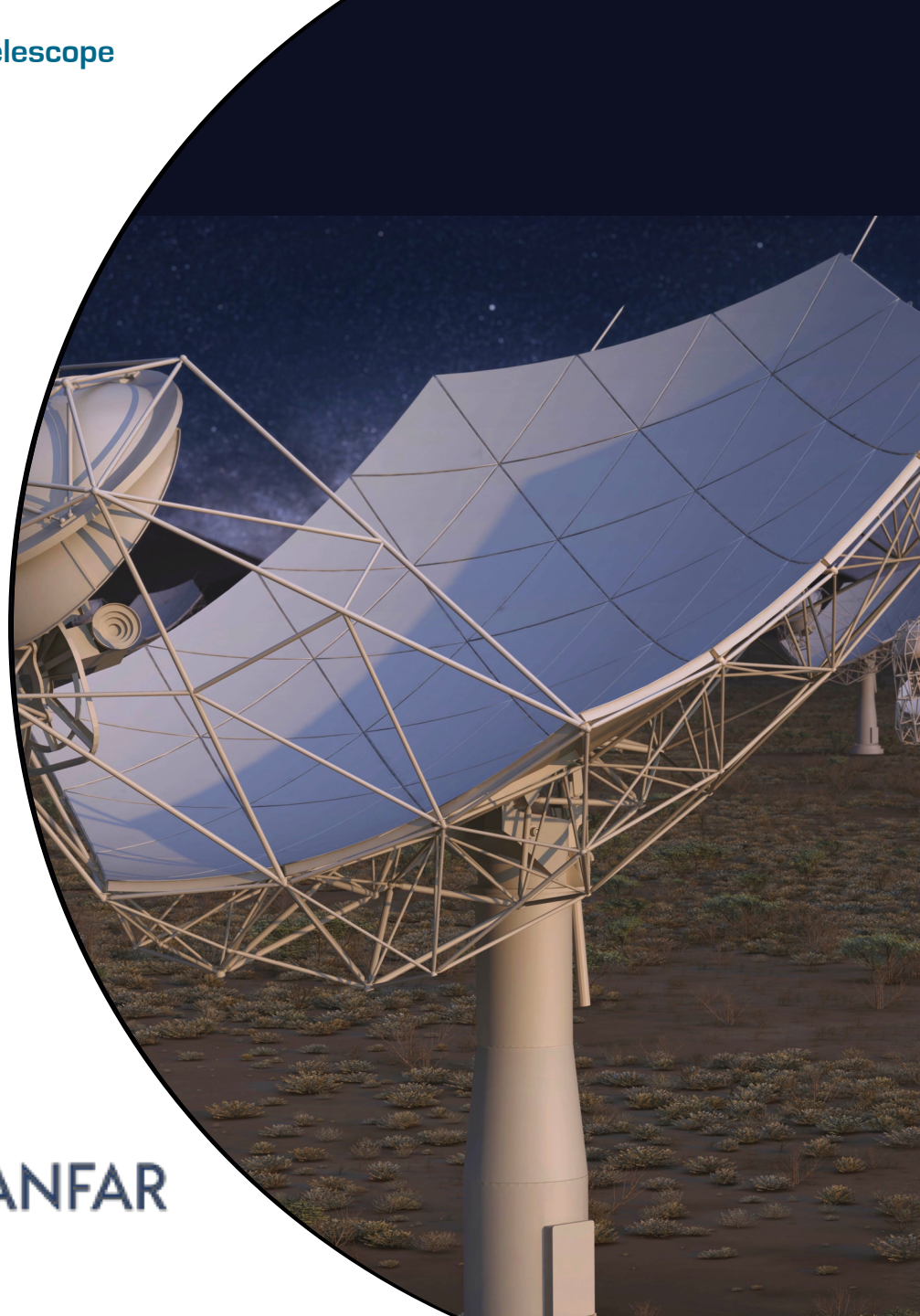
Exploring the Universe with the world's largest radio telescope

The Square Kilometre Array and Canada

Séverin Gaudet
CADC
Canadian SKA Regional Centre

www.skatelescope.ca

@SKACanada



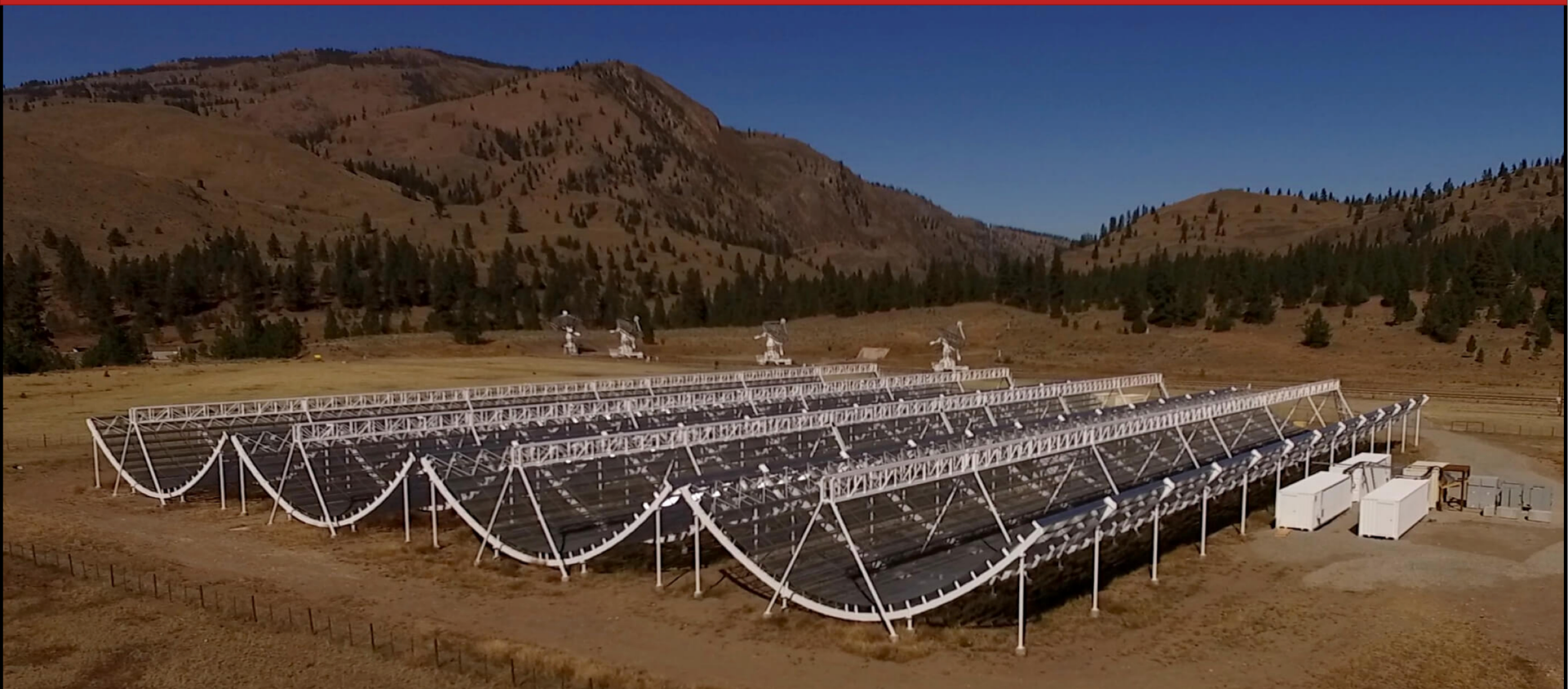
SKA SQUARE KILOMETRE ARRAY CANADA | Canada NRC·CNRC | CANFAR

Exploring the Universe with the world's largest radio telescope

SKA Pathfinder in Canada

CHIME

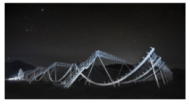
The Canadian Hydrogen Intensity Mapping Experiment is a revolutionary new Canadian radio telescope designed to answer major questions in astrophysics & cosmology.



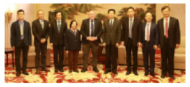
SKA Pathfinder Telescope CHIME Detects Second Repeating Fast Radio Burst

CHIME is an unusual telescope with no moving parts and a huge field of view, which stretches almost from the northern to the southern horizon. (Credit: CHIME)

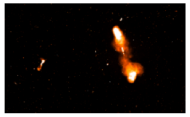
Latest News



9th January 2019
SKA pathfinder telescope CHIME detects second repeating fast radio burst



7th December 2018
Shanghai moves forward with SKA Regional Centre development



26th November 2018
SKA launches first Science Data Challenge for astronomy community

Exploring the Universe with the world's largest radio telescope

SKA and Canada

SKA
SQUARE KILOMETRE ARRAY
CANADA

Canada
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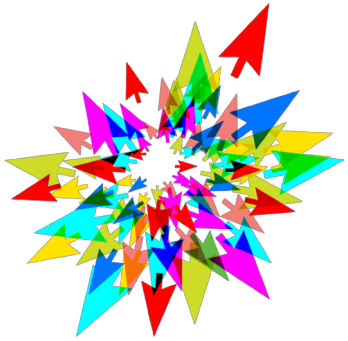
compute canada | calcul canada



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CADC/CCDA
NRC·CNRC Canada

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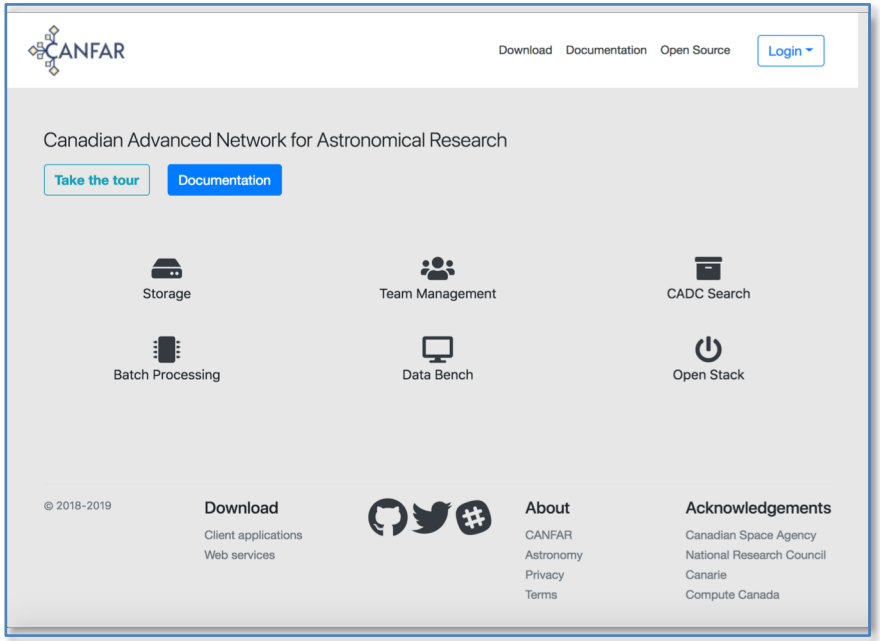
canarie

CIRADA
CANADIAN INITIATIVE FOR RADIO ASTRONOMY DATA ANALYSIS

SRC Pre-cursor activities

CIRADA

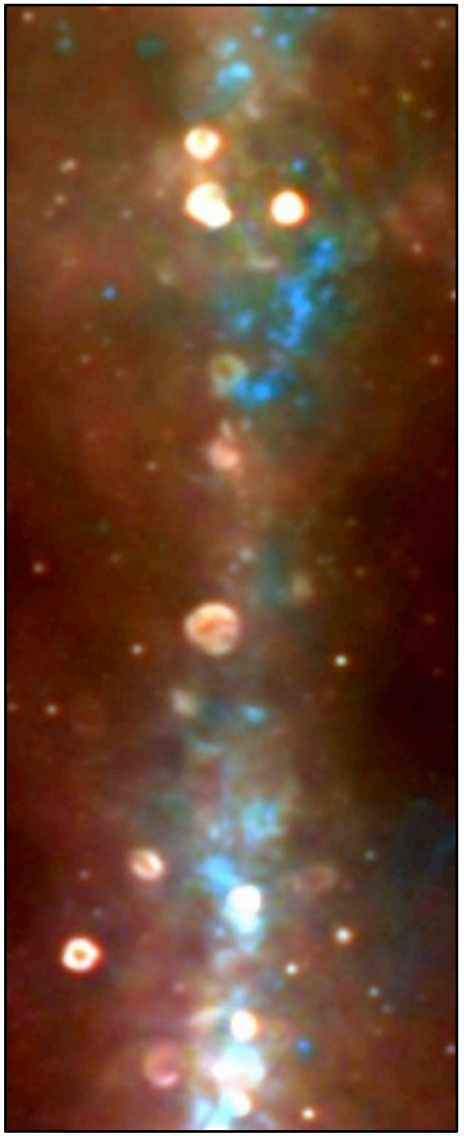
CANADIAN INITIATIVE FOR RADIO ASTRONOMY DATA ANALYSIS



Canadian Initiative for Radio Astronomy Data Analysis

- enhanced data products (EDPs) for VLASS, CHIME and ASKAP surveys
- advanced re-processing of raw data
- unified processing software stack
- cross-matches, advanced analytics, visualisation
- long-term archiving and data access
- ***enables full science return from major Canadian science & instrumentation programs***
- ***Adopting a new science workflow***

- Administrative structure
  - CFI Innovation Fund 2017: $10.6M
  - five year program, commenced April 2018
  - six Canadian universities: Toronto, Alberta, McGill, Queen's, UBC, Manitoba
  - plus NRC, CADC, Compute Canada, NRAO, ASTRON, IDIA, Cornell, Berkeley, Minnesota



Hindson et al. & Johnston-Hollitt et al.

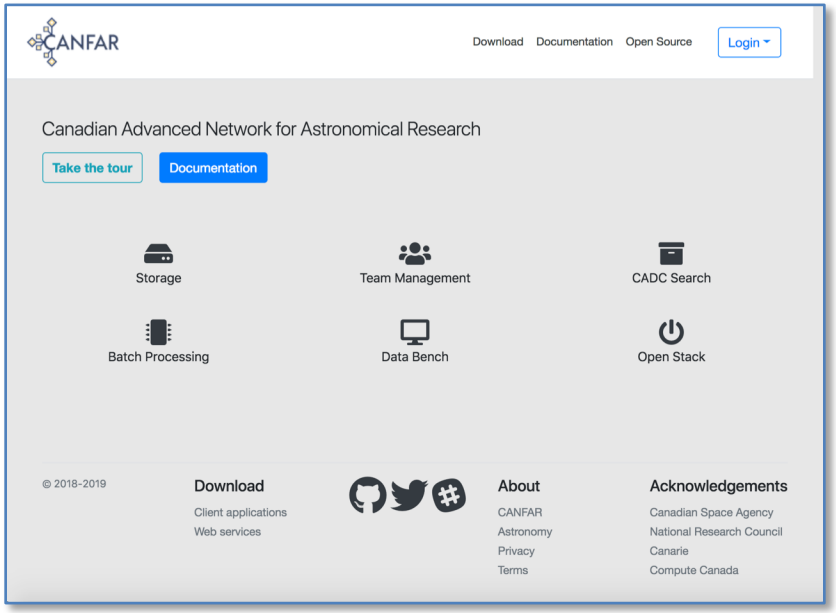
Canadian Astronomy Data Centre

- National facility for open access
- Telescope collections:
  - Multiple missions, facilities and wavelengths
  - Pointed and survey observations
  - 12 telescopes
  - 6 advanced data collections
- IVOA services on data
- Development and operations hub for CANFAR

- Working with longer wavelengths and scaling up infrastructure

Canadian Advanced Network for Astronomical Research

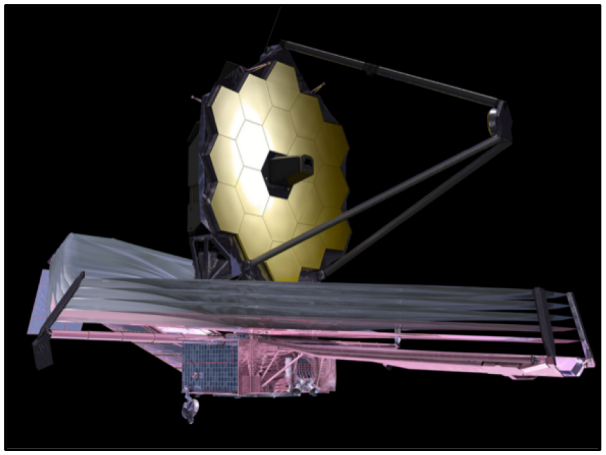
- A science platform
- A cloud ecosystem for data intensive astronomy
- User services
  - Store and share data
  - Create and share VMs
  - Interactive and batch processing close to data
- Federated research cloud resources
- Integrated A&A and access to data



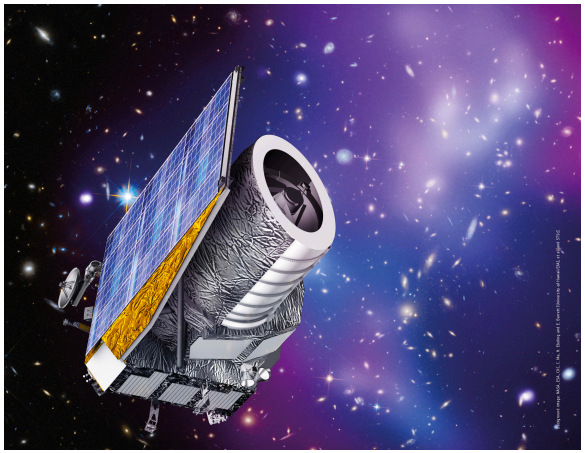
- Supporting CIRDA activities and scaling up infrastructure

The Big Data Context for Canada

Optical: TMT

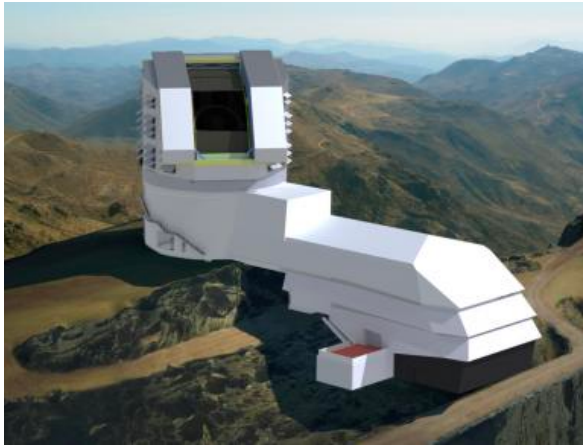


Infrared: JWST



Optical survey: Euclid

Millimetre/sub-mm: ALMA

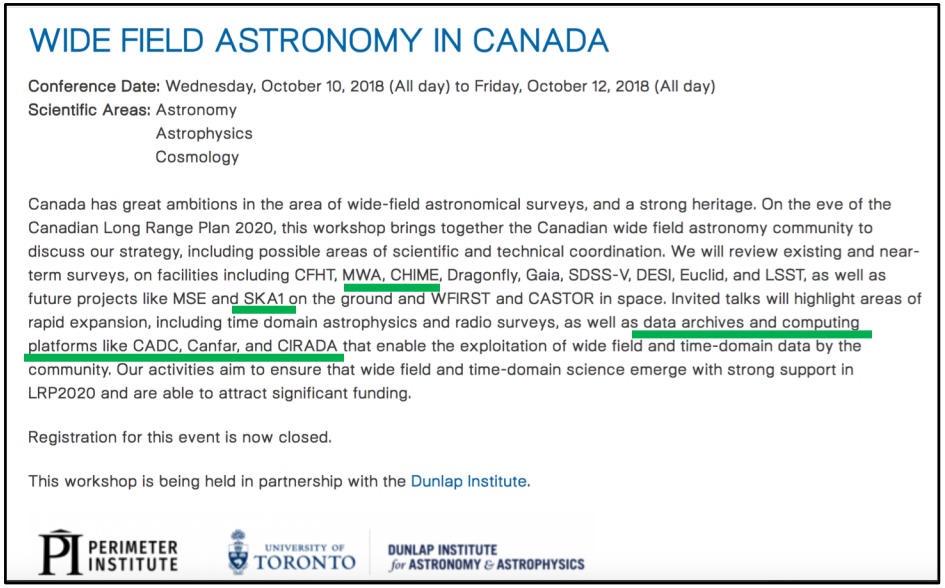


Optical/Synoptic: LSST

Radio: CHIME

Data Science Infrastructure in Canada

- Recognition that Canadian participation in SKA will require a Canadian SRC
- Multi-messenger astronomy is an emerging field
- Recognition that a wavelength agnostic data science infrastructure is in the national interest
- To be included Long-Range Plan 2020 (LRP) for Astronomy



WIDE FIELD ASTRONOMY IN CANADA

Conference Date: Wednesday, October 10, 2018 (All day) to Friday, October 12, 2018 (All day)
Scientific Areas: Astronomy
Astrophysics
Cosmology

Canada has great ambitions in the area of wide-field astronomical surveys, and a strong heritage. On the eve of the Canadian Long Range Plan 2020, this workshop brings together the Canadian wide field astronomy community to discuss our strategy, including possible areas of scientific and technical coordination. We will review existing and near-term surveys, on facilities including CFHT, MWA, CHIME, Dragonfly, Gaia, SDSS-V, DESI, Euclid, and LSST, as well as future projects like MSE and SKA1 on the ground and WFIRST and CASTOR in space. Invited talks will highlight areas of rapid expansion, including time domain astrophysics and radio surveys, as well as data archives and computing platforms like CADC, Canfar, and CIRADA that enable the exploitation of wide field and time-domain data by the community. Our activities aim to ensure that wide field and time-domain science emerge with strong support in LRP2020 and are able to attract significant funding.

Registration for this event is now closed.

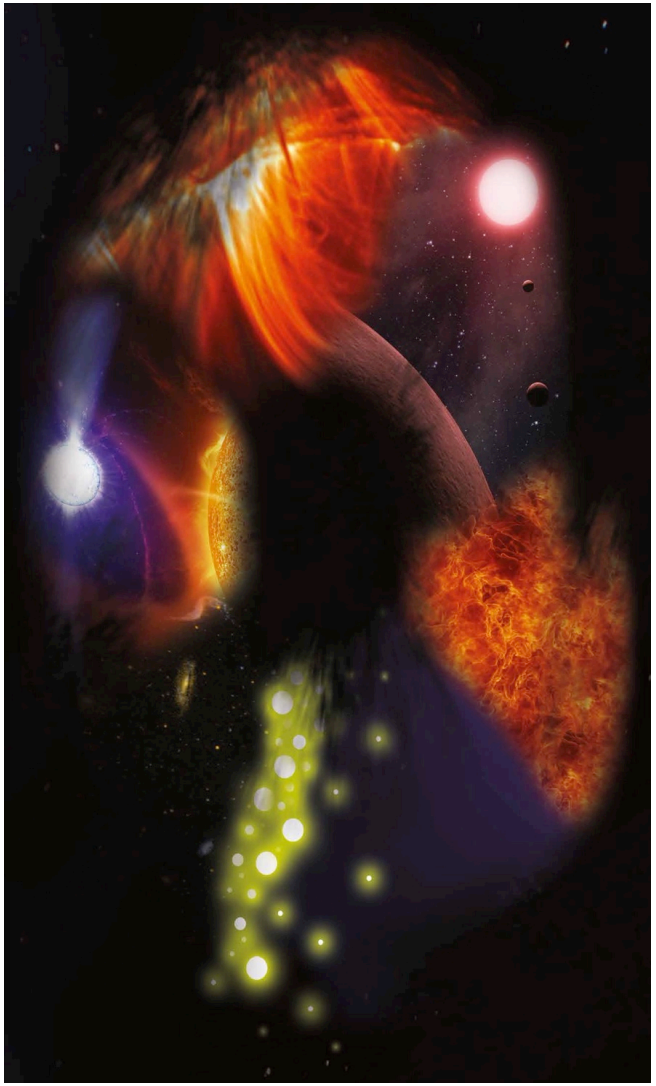
This workshop is being held in partnership with the Dunlap Institute.

PERIMETER INSTITUTE · UNIVERSITY OF TORONTO · DUNLAP INSTITUTE for ASTRONOMY & ASTROPHYSICS

Next Steps for SRC in Canada

- A science data platform is an area of strength!

- Build upon the CIRADA, CADC and CANFAR activities
- Define a scientific vision for an SRC
  - Scope of activities
  - Share
  - Budget
- Science data platform white paper for Long-Range
- Continued participation in international SRC developments



SKA Organisation, Djorgovski et al., C. Reed NASA / JPL-Caltech / SSC, NASA / Stanford Lockheed-Martin Institute for Space Research's TRACE team

Thank you

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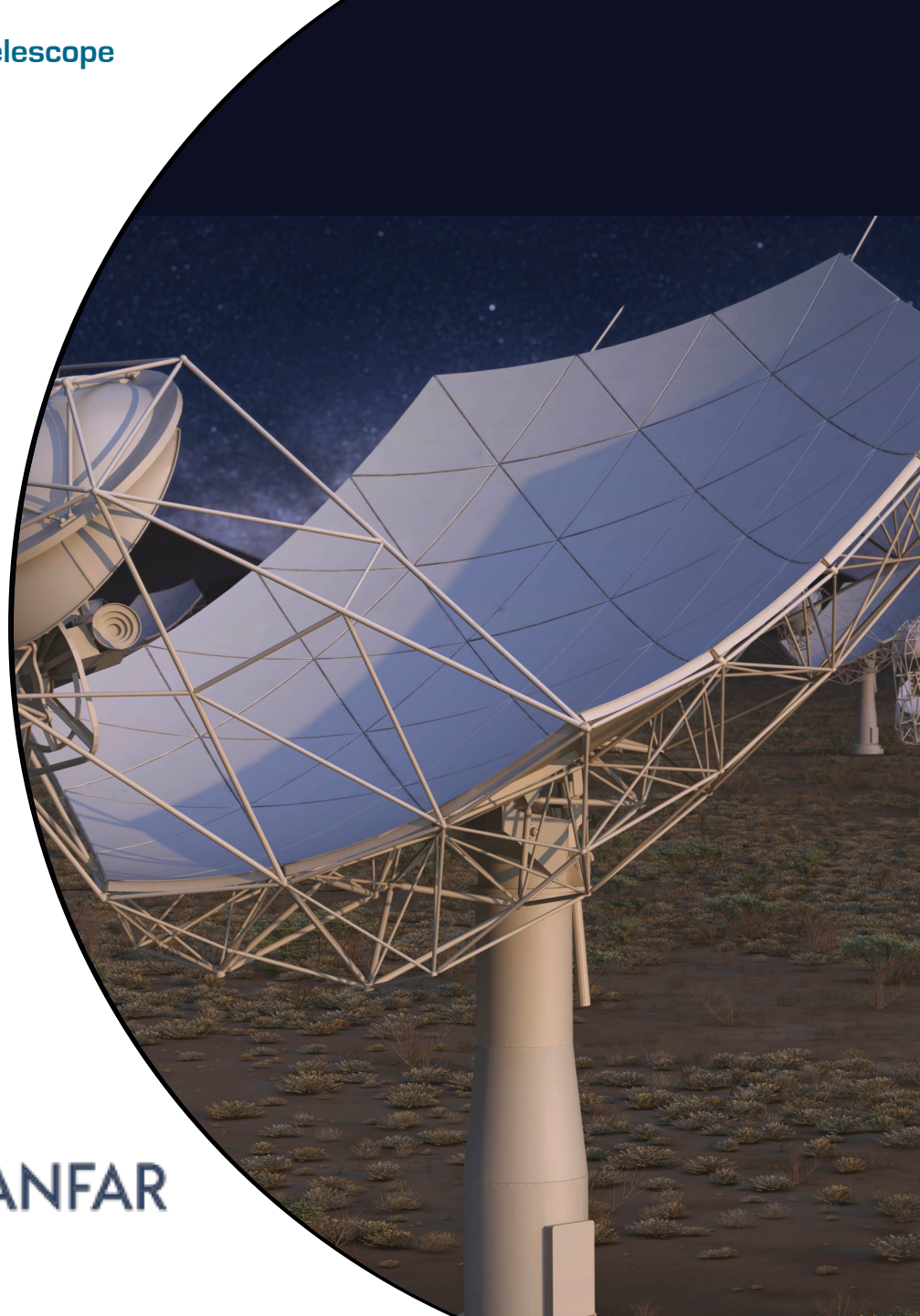

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