

The Square Kilometre Array and Canada

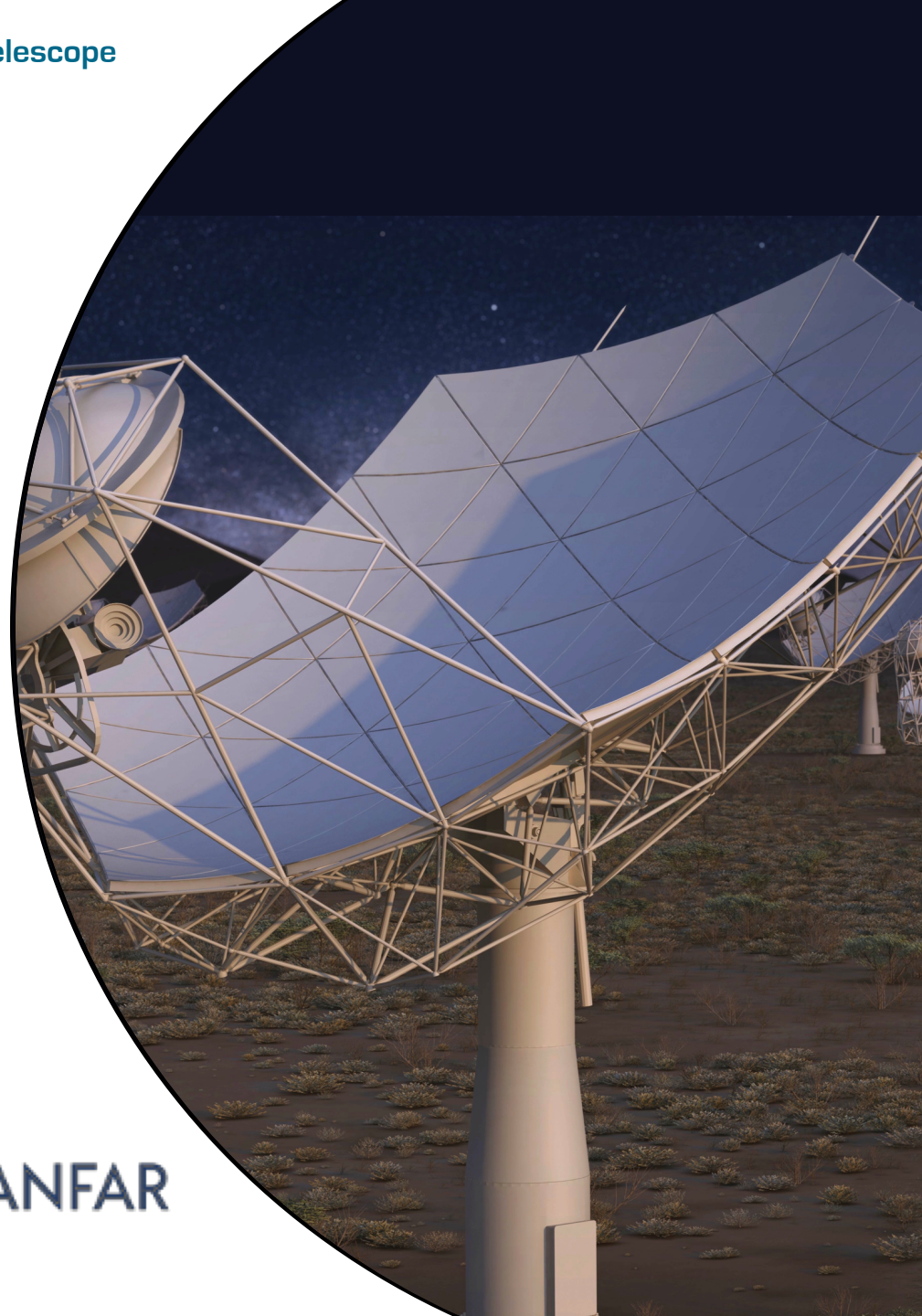
Séverin Gaudet
CADC

Canadian SKA Regional Centre

www.skatelescope.ca



@SKACanada

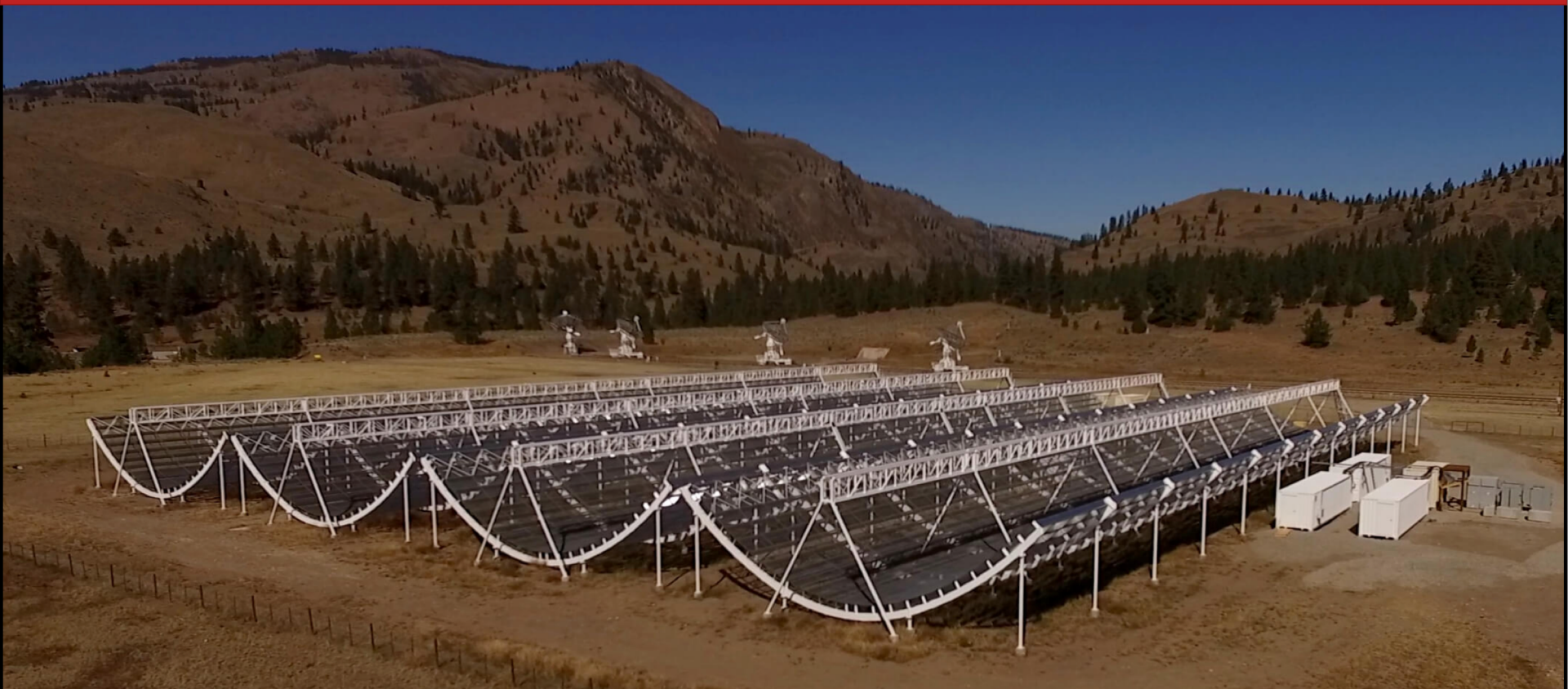


SKA Pathfinder in Canada

CHIME

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

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- [Instrument](#)
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SKA TELESCOPE

SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

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SKA Pathfinder Telescope CHIME Detects Second Repeating Fast Radio Burst



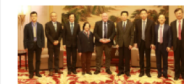
CHIME is an unusual telescope with no moving parts and a huge field of view, which stretches almost from the northern to the southern horizon. (Credit: CHIME)

Latest News



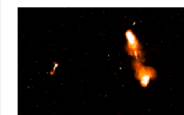
9th January 2019

SKA pathfinder telescope CHIME detects second repeating fast radio burst



7th December 2018

Shanghai moves forward with SKA Regional Centre development



26th November 2018

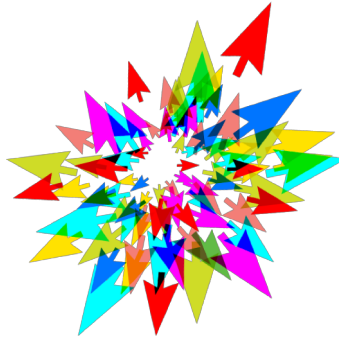
SKA launches first Science Data Challenge for astronomy community



SKA and Canada



compute | calcul
canada | canada





SRC Pre-cursor activities



CIRADA

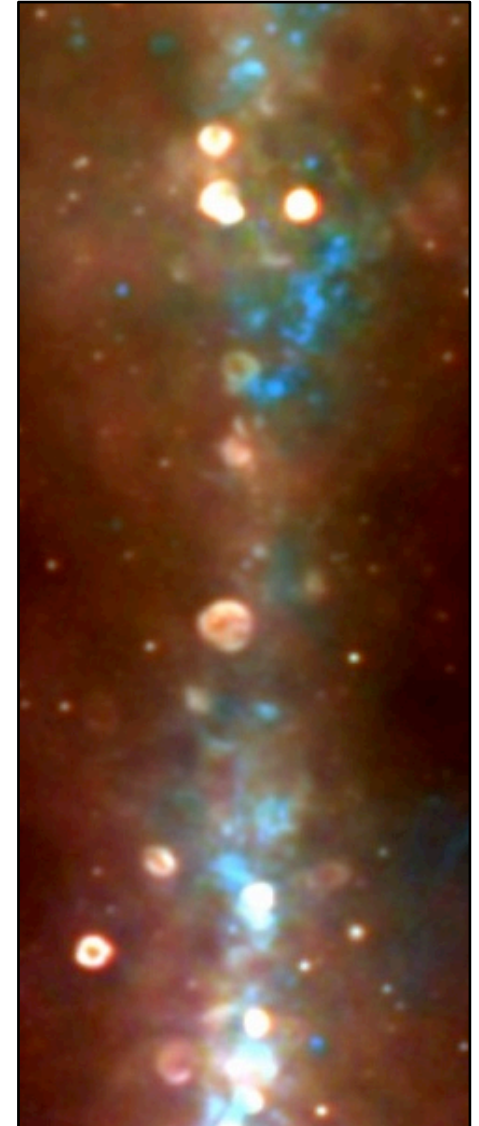
CANADIAN INITIATIVE FOR RADIO ASTRONOMY DATA ANALYSIS

The screenshot shows the CADC website interface. At the top, it says "Canadian Astronomy Data Centre" with the Canada wordmark and a red maple leaf. A navigation bar includes "Telescope Data Products", "Advanced Data Products", "Services", "Advanced Search", and "Login". Below this is a search bar with the text "Search for data by target" and a "Search" button. The main content area is divided into three columns: "Telescope Data Products" (listing Gemini, CFHT, JCMT, HST, BLAST, MOST, DAO, MACHO, OMM, FUSE, UKIRT), "Advanced Data Products" (listing MegaPipe, HLA, IRIS, CGPS, CFHTLS, WIRwolf), and "Services" (listing Meetings, Community, SSOIS, CANFAR). A footer contains "Terms and conditions", "Transparency", "News", and "Contact us" (with email and address fields).

The screenshot shows the CANFAR website interface. At the top, it says "CANFAR" with a logo, and navigation links for "Download", "Documentation", "Open Source", and a "Login" button. The main heading is "Canadian Advanced Network for Astronomical Research". Below this are two buttons: "Take the tour" and "Documentation". The central area features a grid of service icons: "Storage", "Batch Processing", "Team Management", "Data Bench", "CANFAR Search", and "Open Stack". The footer includes "© 2018-2019", "Download" (with sub-links for "Client applications" and "Web services"), social media icons for GitHub, Twitter, and a hashtag, "About" (with sub-links for "CANFAR", "Astronomy", "Privacy", "Terms"), and "Acknowledgements" (listing "Canadian Space Agency", "National Research Council", "Canarie", and "Compute Canada").

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





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

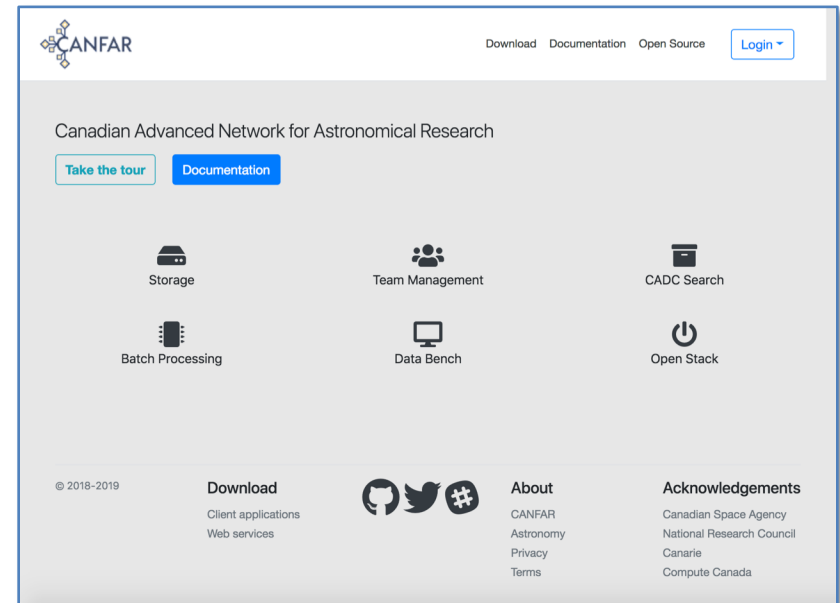




Canadian Advanced Network for Astronomical Research

- 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

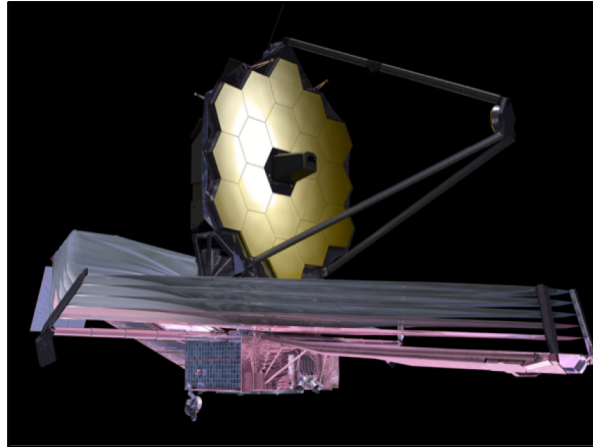
- Supporting CIRDA activities and scaling up infrastructure



The Big Data Context for Canada



Optical: TMT



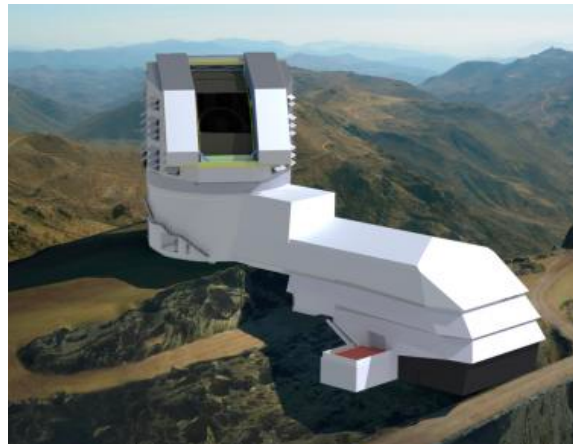
Infrared: JWST



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.

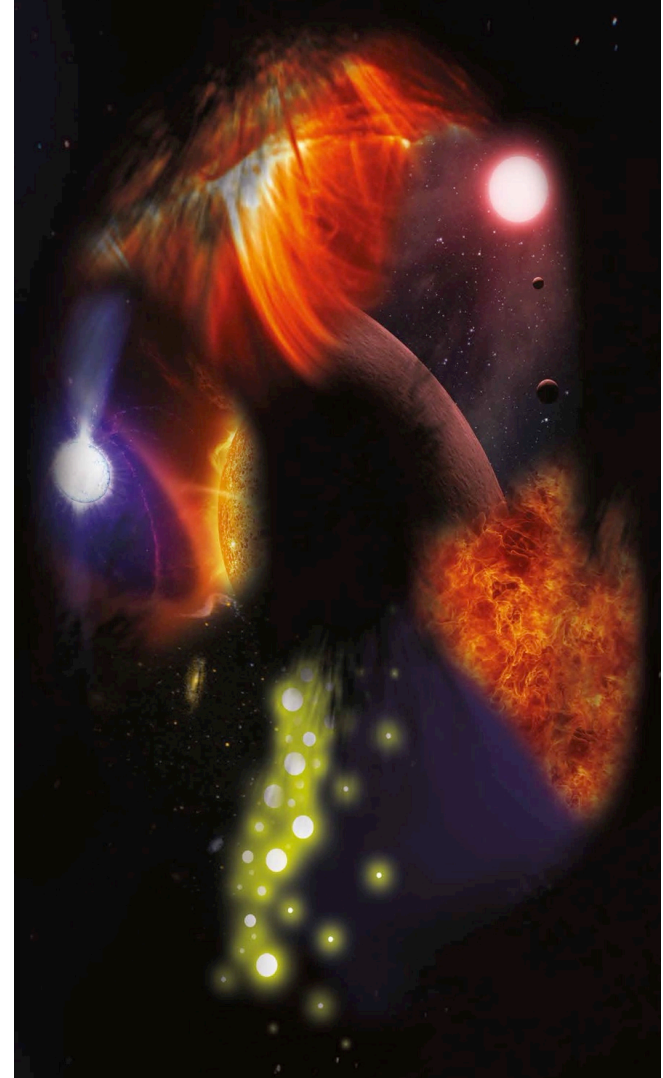
This workshop is being held in partnership with the [Dunlap Institute](#).



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



Thank you

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