ICRAR

International Centre for Radio Astronomy Research

The gas cycle of galaxies in the local Universe

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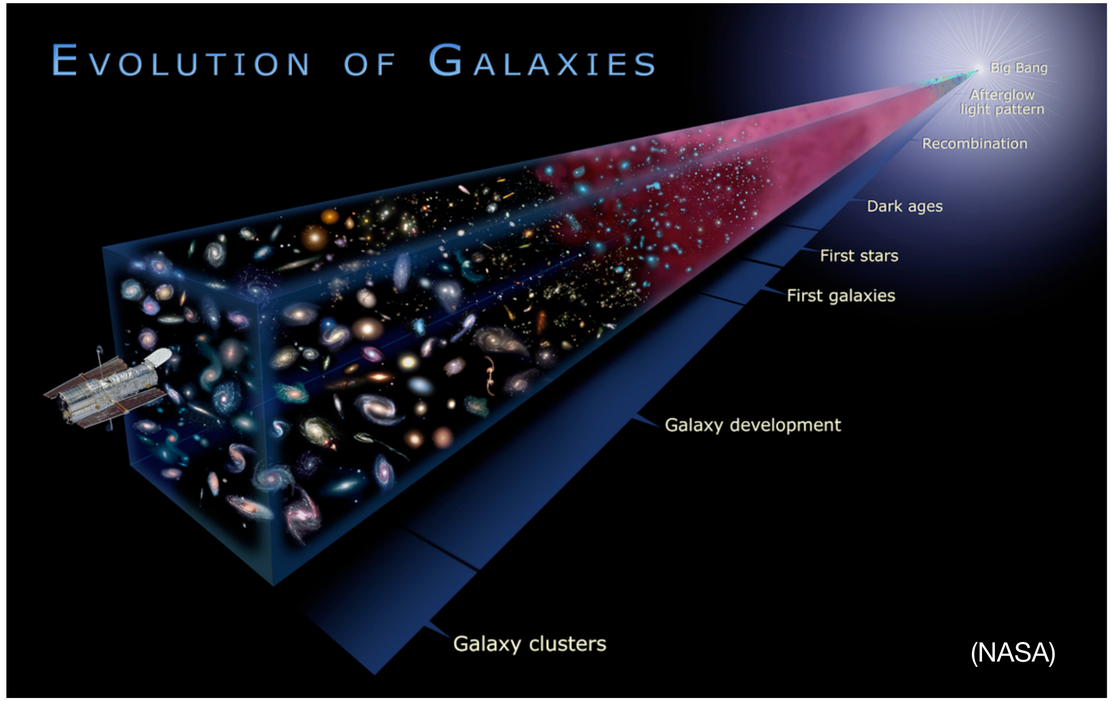
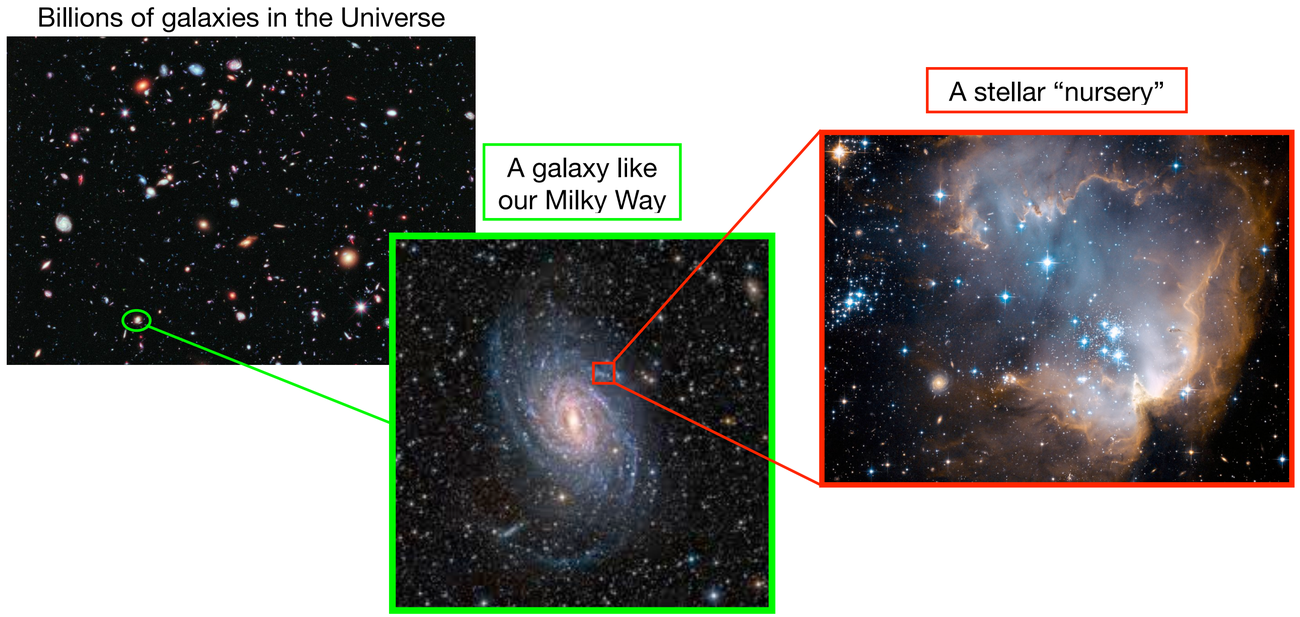
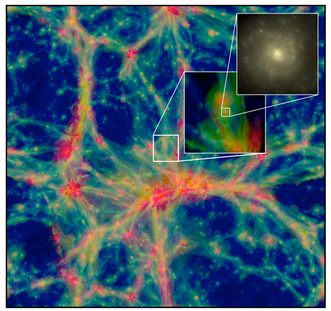
Government of Western Australia
Department of the Premier and Cabinet
Office of Science

Galaxy formation and evolution at ICRAR



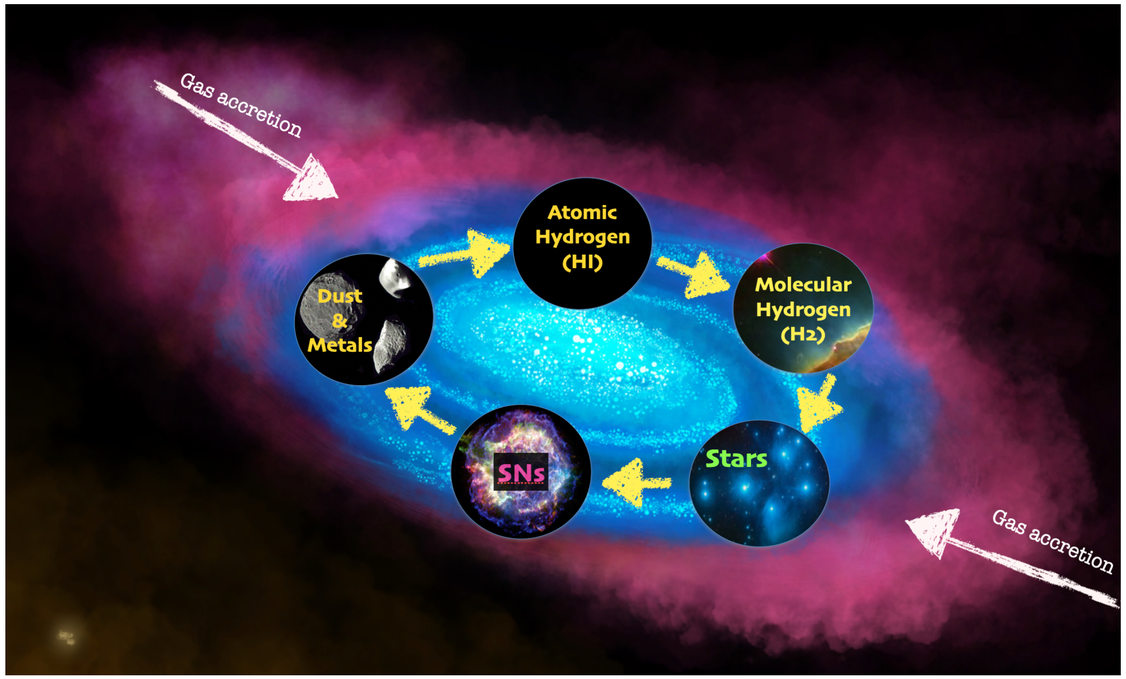
The gas cycle of galaxies in the local Universe





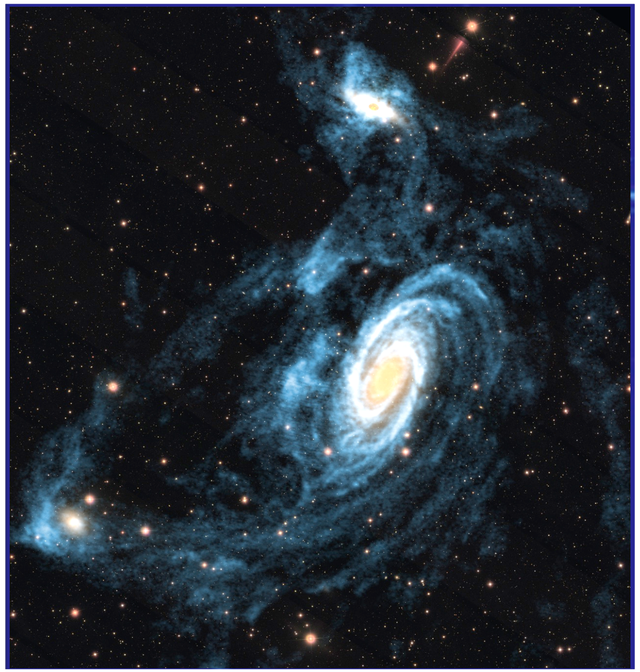
- We use the **best telescopes in the world** to study how galaxies use their gas to form stars, and what physical processes determine their properties
- This requires **multi-wavelength observations** to trace all baryonic components (atomic and molecular gas, stars, dust…) and comparison with models/theory

The gas cycle of galaxies in the local Universe



OPTICAL IMAGE (stars)

RADIO IMAGE (atomic gas)

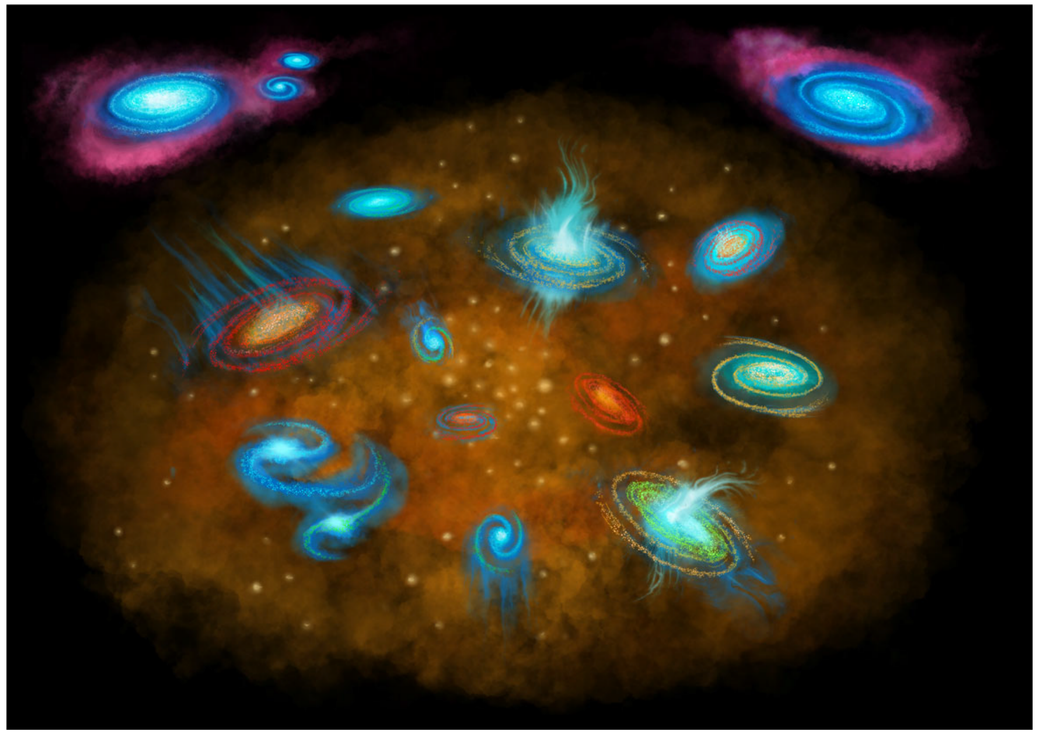


- ✦ Cold gas is the **fuel for star formation** >> central role in evolution of galaxies
- ✦ Cold gas is easily affected by galaxy interactions >> **unique probe of environmental effects** on galaxies
- ✦ Radio data carry information on the kinematics of the gas >> **dark matter** content of galaxies

Discovering galaxies with radio (and other) telescopes

We lead **cutting-edge radio surveys** to find answers to key open questions:

- ✦ How efficiently is gas used to make new stars in different galaxies?
- ✦ How does environment affect galaxy properties?
- ✦ How does gas accrete onto galaxies?
- ✦ Why are some galaxies running out of gas?



Our group and expertise at ICRAR

Barbara **Catinella** (lead)

Brent **Groves**

Gerhardt **Meurer**

Maria **Rioja**

Lister **Staveley-Smith**

Tobias **Westmeier**

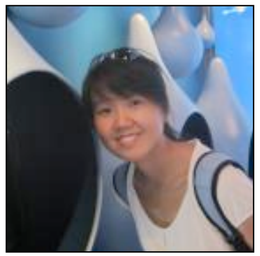
Ivy **Wong** (affiliate)

Bi-Qing **For**

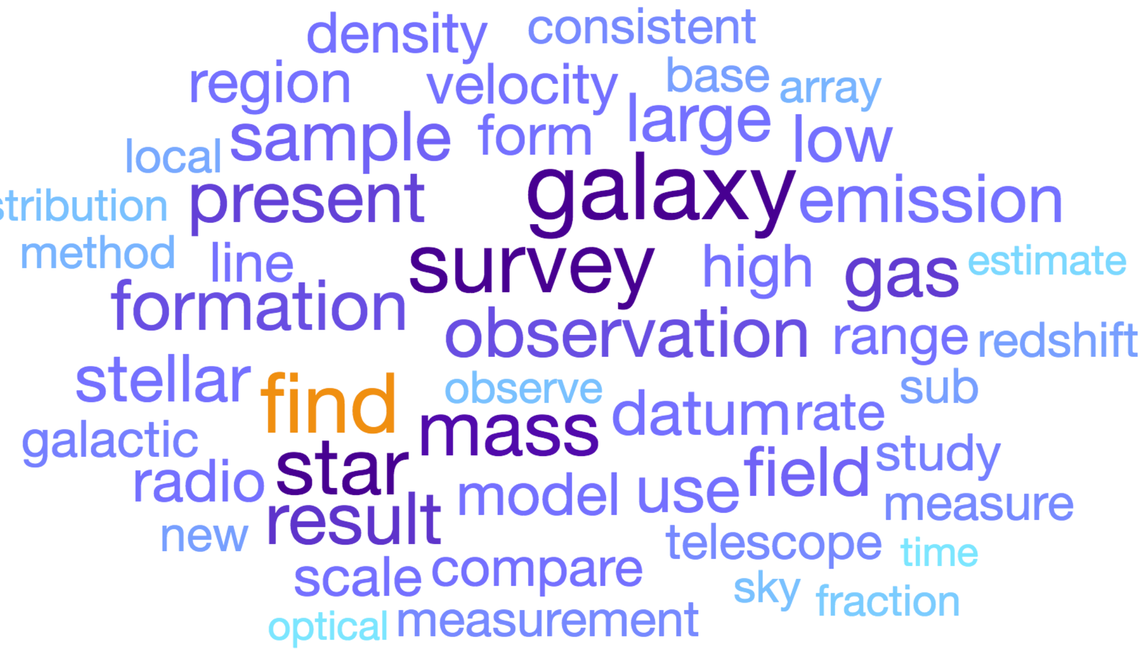
Tristan **Reynolds**

Manasvee **Saraf**

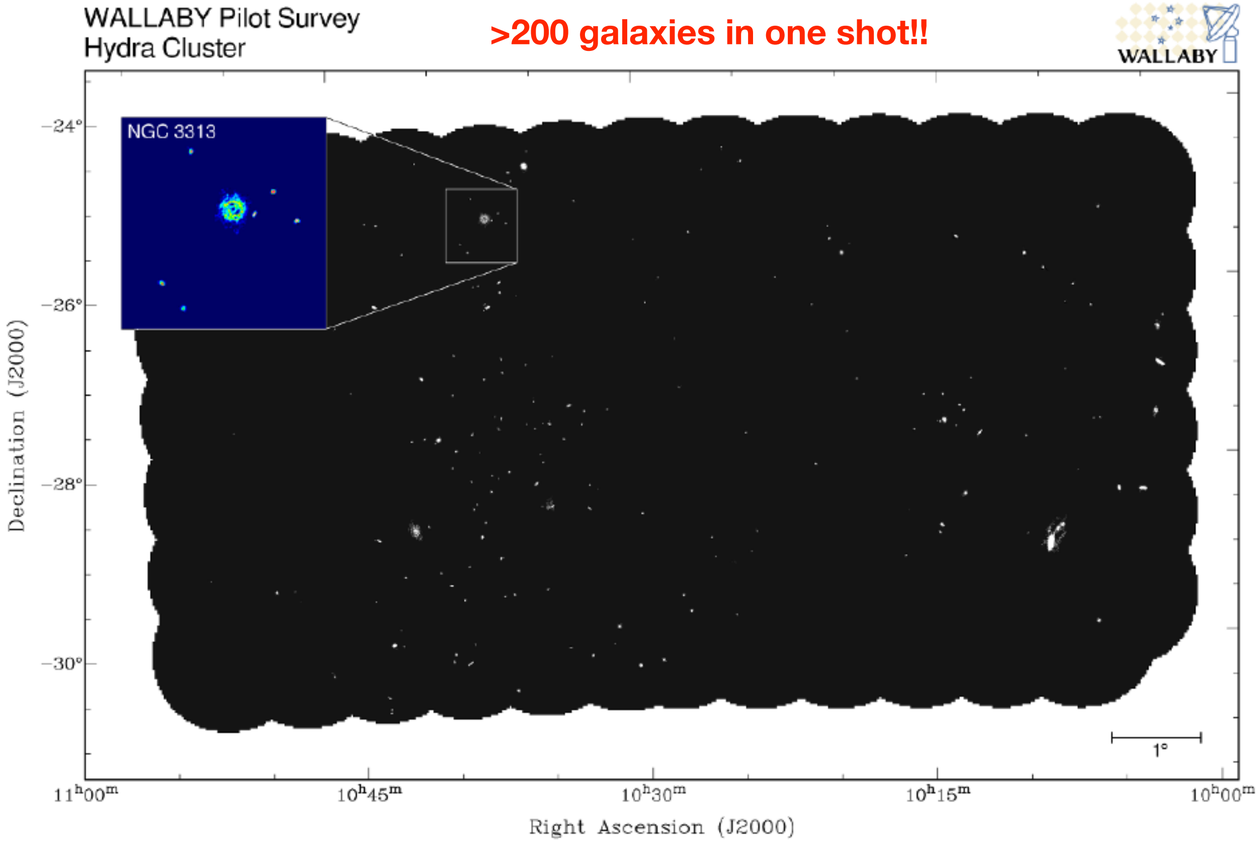
Adam **Watts**

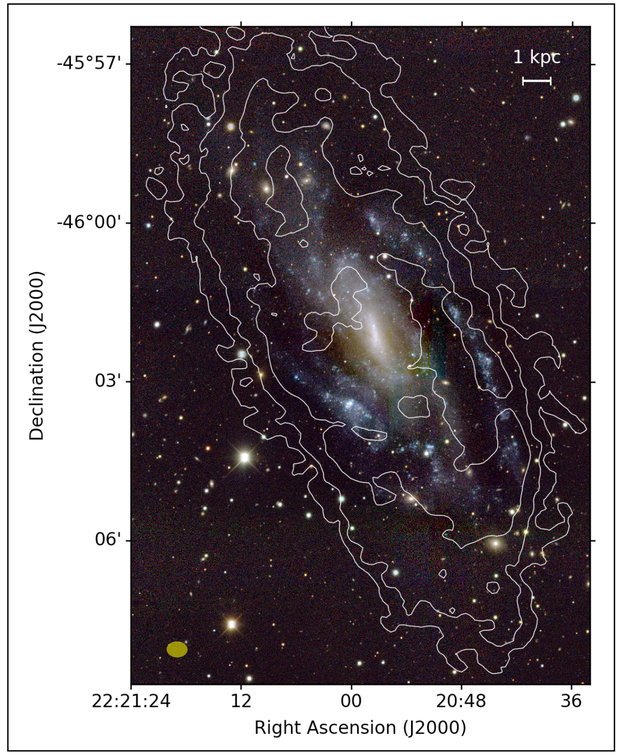


Pei **Zuo**



WALLABY: the ASKAP HI All-sky survey





Australian SKA Pathfinder

★ 36 telescopes in radio quiet site in midwest WA

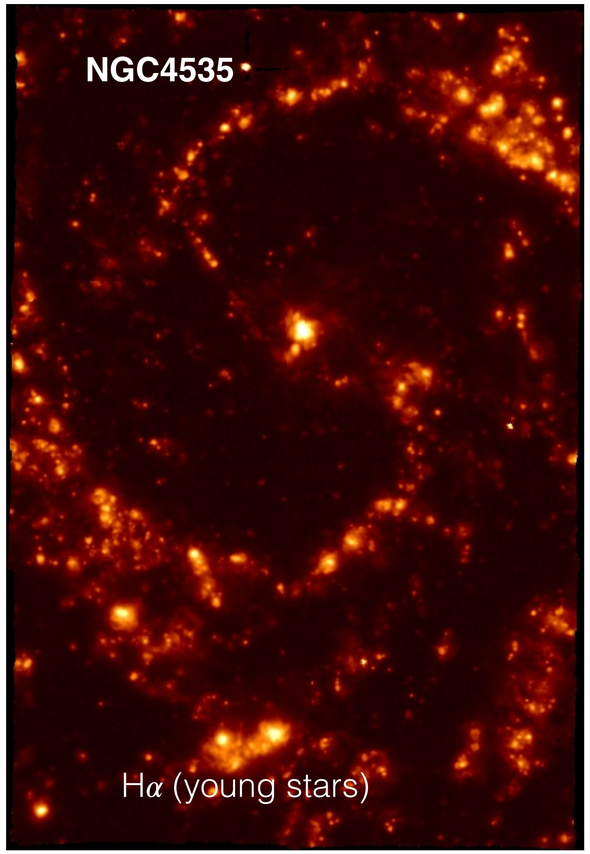
★ 30 deg² field of view → **a survey machine!**

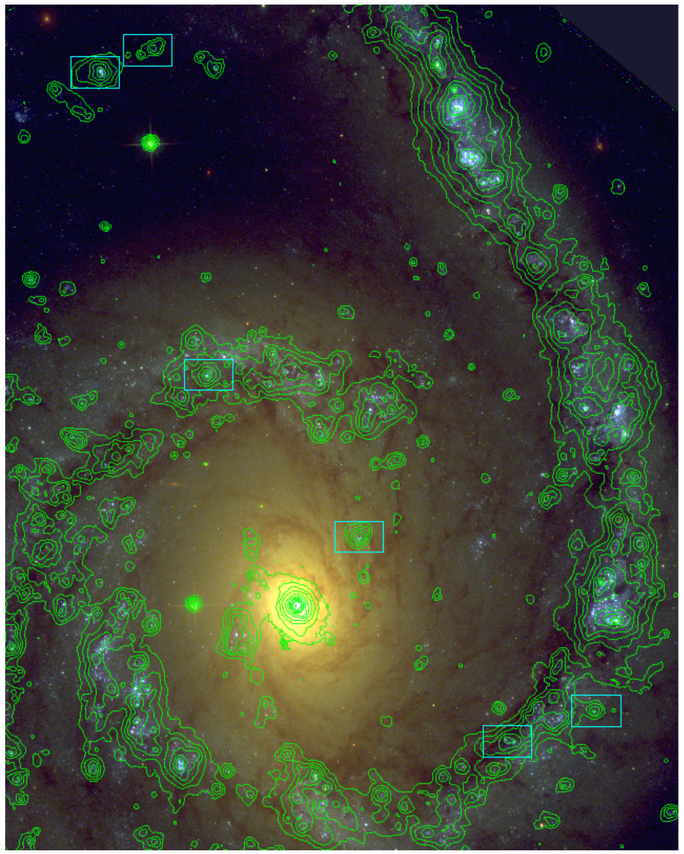
WALLABY

★ Unprecedented statistics: **largest census of atomic hydrogen ever done**

★ **600,000 galaxies** out to z-0.26 (~3 Gyr look-back time), **~5000 well resolved** (maps)

Star formation in nearby galaxies with exquisite detail





- What regulates star formation in nearby galaxies?
- Why are some galaxies actively forming stars, and others not at all?

Why should you join us?

- ✦ **Exciting science** — we lead some of the most cutting-edge galaxy surveys in the world
- ✦ Learn how to take/process/understand **data from the best telescopes out there**
- ✦ Acquire **strong problem solving and analytic skills**
- ✦ Develop your **computational skills**
- ✦ **Become a leader** in Square Kilometre Array and galaxy evolution science
- ✦ Join a **fantastic and supportive working environment!**