## Dillon Z. Dong


CONTACT INFORMATION

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EDUCATION

**Pomona College**, Claremont, CA, USA

B.A., Physics and Mathematics, Expected May 2015

GPA: 3.89/4.00 Physics GPA: 4.00/4.00 Physics GRE: 960 (91%)

- Physics Thesis: *Studying Star Formation in Nearby Galaxies with 33GHz Radio Interferometry*

  Advisers: Dr. Eric Murphy (IPAC/Caltech) & Dr. Phil Choi (Pomona College)

- Math Thesis: *The Effect of Boundary Conditions on Random Lozenge and Domino Tiling Statistics*

  Adviser: Dr. Vin de Silva (Pomona College)

**Budapest Semesters in Mathematics**, Budapest, Hungary

Study Abroad Program, Fall 2013

GPA: 4.00/4.00

RESEARCH EXPERIENCE

**The Star Formation in Radio Survey** June 2012 to present
Carnegie Observatories, Caltech

- Calibrated and imaged a set of 33GHz VLA observations of 118 star forming regions and galaxy nuclei in 56 nearby galaxies.
- Wrote a set of Python scripts capable of reproducing each calibration from raw archive data.
- Currently doing photometry and decoupling thermal/synchrotron components to measure direct, dust unbiased star formation rates. These measurements will be compared with IR, UV, H$\alpha$, CO and other star formation diagnostics to help determine how star formation tracer discrepancies correlate with physical conditions in HII regions.

**Spectral Index Mapping of NGC1266** June 2013 to present
Caltech

- Wrote a successful director's discretionary time proposal for a new 6GHz VLA image of NGC1266, a low level AGN ejecting $> 50 M_{\odot}$ of gas per year
- Created spectral index and curvature maps using the new 6GHz image, an archival 1.4GHz image and 3GHz & 33GHz images taken as part of the Star Formation in Radio Survey
- Currently analyzing these maps to trace the spectral aging of the outflow and look for evidence of shocks

**Herschel Edge-on Galaxy Survey** August 2014 - present
Caltech

- Ran PACS and SPIRE photometer images of all nearby galaxies with inclination $> 89°$ through the HIPE Madmap and Scanamorphos pipelines, modifying the script at times to remove image artifacts.
- Currently writing IDL code to fit vertical/radial profiles and IR scale heights for each galaxy. I will also conduct this analysis on ancillary Spitzer data, producing a spatially resolved IR SED in order to model the population of dust in galaxy halos and study halo-disk dust cycling.

## Awards

- Barry M. Goldwater Scholar 2014
- Tileston Junior Physics Prize 2014
- High Academic Honors, Budapest Semesters in Mathematics F/2013
- Tileston Sophomore Physics Prize 2013
- Electronics Project featured on instructables.com 2013
- 2nd place Beginners Prize, Claremont Colleges Hackathon S/2013
- Moncrieff Freshman Astronomy Prize 2012
- 3x Pomona College Scholar F/2011, F/2012, S/2013

## Computer Skills

- *Python*: Proficient at most general programming tasks. Some experience with matplotlib, pyfits, numpy and scipy. Have implemented a range of programming techniques, including a genetic algorithm and an AI Connect 4 bot which won 1st place in the Harvey Mudd CS 5 class tournament.
- *CASA*: Experienced at reducing high frequency VLA continuum data and proficient at image analysis techniques.
- *IDL*: Proficient at manipulating fits files, fitting data with MPFIT, general array manipulation, plotting and computations.
- *HIPE*: Proficient at standard calibration of PACS and SPIRE photometer data.
- *Pyraf*: Proficient at standard calibration and aperture photometry techniques.
- *Matlab*: Some experience with general array manipulation, implementing Runge-Kutta 4, fast Fourier transforms, other computational physics methods
- *Mathematica*: Some experience with linear programming, solving differential equations, other computational physics methods

## Selected Courses

- *Astronomy*: Observational Techniques in Astronomy, Introduction to Astrophysics, Cosmology / Extragalactic Astrophysics, Galactic Astronomy, High Energy Astrophysics (planned), Stellar Structure and Evolution (planned)
- *Physics*: General Relativity, Elementary Particle Physics, Quantum Mechanics, Electricity and Magnetism, Statistical Mechanics (planned)
- *Computer Science*: Computational Physics (Matlab, Mathematica), Introduction to Computer Science (Python), Combinatorial Optimization (graph algorithms)
- *Math*: Deterministic Operations Research, Differential Equations, Quantum Information (Advanced Linear Algebra / Operator theory), Vector Calculus, Statistical Time Series (planned)
- *General Education*: Methods in Anthropological Inquiry, Ethical Theory, Bioethics, All Power to the People (a history of US social justice movements)

## Observing Experience

- Conducted on-site and remote observations using the Pomona College 1 meter telescope at Table Mountain. Projects include astrometry of Pluto's orbit and light curve measurement of two exoplanet transits.
- Helped plan a VLA scheduling block for 3GHz continuum imaging of NGC1266.

## Other Activities and Interests

*Personal Mentoring*:

- Pomona College Sponsor - live in community leader for a hall of first years. (F/2012, S/2013)
- Asian American Mentoring Program member - Helped organize activities promoting cohesion in Pomona's Asian American community (F/2011 - S/2013)

*Academic Mentoring*:

- Spacetime, Quanta and Entropy twice weekly in-class mentor (F/2013)
- Introductory Physics weekly late-night mentor (S/2014)

*Campus Involvement*:

- Claremont Vegetarian Club Co-President - Helped advocate for more ethical and environmentally friendly eating in Pomona's dining halls and beyond. (S/2013 - present)
- Harwood Discussion Forum member - a platform for Claremont students to discuss all kinds of topics relevant to our lives, from the gender disparity in science to current events to our latest philosophical musings. (S/2012 - present)

*Other activities*:

In my spare time, I enjoy cooking, speed-solving Rubik's cubes and other twisty puzzles (my 3x3 average is $\sim$25 seconds), watching baseball and analyzing advanced baseball statistics.