Che-Yu Chen

Department of Astronomy, University of Virginia
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Research Interests: MHD Simulation; Star Formation Theory;
Magnetic Field (Polarimetry) and Gas Dynamics in ISM/Molecular Cloud/Dense Cores

EDUCATION

University of Maryland, *College Park, MD*	**Ph.D.** in Astronomy	2015
University of Maryland, *College Park, MD*	**M.S.** in Astronomy	2010
National Taiwan University, *Taipei, Taiwan*	**M.S.** in Astrophysics	2008
National Taiwan University, *Taipei, Taiwan*	**B.S.** in Physics	2007

EMPLOYMENT

Research Scientist, Department of Astronomy, University of Virginia — 2018 - present

VITA Postdoctoral Fellow, Virginia Institute of Theoretical Astronomy
Department of Astronomy, University of Virginia — 2015 - 2018
Maternity leave: July – October 2015, February – May 2017

GRANTS and AWARDS

Astronomy and Astrophysics Research Grant, NSF — 2018
Co-PI/key personnel, 3-yr project, total amount $390,320

VITA Postdoctoral Prize Fellowship, University of Virginia — 2015

NASA Earth and Space Science Fellowship, NASA — 2013

Ann G. Wylie Dissertation Fellowship (declined), University of Maryland — 2013

Graduate Student Summer Research Fellowship, University of Maryland — 2011

Dean's Fellowship, Department of Astronomy, University of Maryland — 2008

Presidential Awards, Department of Physics, National Taiwan University — 2006, 2007

SCIENTIFIC PRESENTATIONS (selected)

- **(colloquium)** "**From Molecular Clouds to Collapsing Cores: The Modern View of Star Formation**", Institute of Astronomy and Astrophysics, Academia Sinica, Taipei, Taiwan (2019)
  Institute of Astronomy, National Tsing-Hua University, Hsinchu, Taiwan (2019)
- **(invited)** "**Formation, Kinematics, and Polarimetric Properties of Simulated Filaments**", *Interstellar filament paradigm: On their formation, evolution, and role in star formation*, Nagoya University, Japan (2018)
- "**Formation of Magnetized Prestellar Cores in Turbulent Clouds**", *Magnetic Fields or Turbulence: Which is the critical factor for the formation of stars and planetary disks*, NTHU, Hsinchu, Taiwan (2018)
- "**Magnetized Prestellar Core Formation in Turbulent Cloud**", *Star Formation Across Space and Time*, ESA-ESTEC, Noordwijk, Netherlands (2014)
- "**Numerical Simulations of Filament Formation and Fragmentation**", *Filamentary Structure in Molecular Clouds*, NRAO, Charlottesville, VA (2014)
- **(seminar)** "**Formation of Magnetized Prestellar Cores with Ambipolar Diffusion and Turbulence**", *Star Formation/ISM Rendezvous*, Princeton University (2013)

SUCCESSFUL OBSERVING PROPOSALS (selected)

PI, GBT semester 2020A **(large program)**, *Characterizing the Internal Velocity Fields of Star-forming Cores with GBT-Argus*, **228.5 hr, highly ranked (0.26 over 10; 0 is the best)**

PI, ALMA Cycle 7 (2019), *Tracing The Progression of Gas Kinematics from Envelopes to Protostellar Disks*, **17.9 hr, B-ranked**

Co-PI, GBT Semester 2017B, *Characterizing the Internal Velocity Fields of Cores with GBT-ARGUS* (co-PI: S. Storm), **16.1 hr, highly ranked (0.93 over 10; 0 is the best)**

Co-I, SOFIA Cycle 7 (2018), *Joint HAWC+/ALMA Investigation of Young Protostars in Ophiuchus* (PI: G. Novak), 5.3 hr, grade: excellent

Co-I, ALMA Cycle 6 (2018), *Multiscale tests of dense filament and core formation in a magnetized molecular cloud* (PI: L. Fissel), 9.3 hr, B-ranked

ACADEMIC SERVICE and ADVISING

Journal referee / Panel reviewer, *A&A, ApJ, NASA*	2018−present
Co-advising students: *P. King* (PhD 2019), *A. Lam* (PhD candidate), *R. Mazzei* (PhD student), *J. Washington*, *C. Sullivan* (undergraduate students)	2016−present
Coordinator, *UVA-NRAO Star Formation Lunch Meeting*	2018−2019
Poster Contest Judge, *Interstellar Filament Paradigm Conference*	2018
On-site Observer, *Combined Array for Research in Millimeter-wave Astronomy*	2013−2014
Co-chair, *UMD Astronomy Graduate Student Seminar*	2009−2010

DIVERSITY and PUBLIC OUTREACH

Letters to a Pre-Scientist, volunteer *Being a scientist pen pal to 5-9th grade students in low-income schools*	2018−present
McCormick Observatory Public Night, speaker *Giving scientific presentations to general audience*	2016−present
UMD Observatory Open House, volunteer	2008−2013
Maryland Day, volunteer	2009−2010

SYNERGISTIC EXPERIENCES

- **Code Development:** implemented algorithms for sink particle (MHD version), super-timestepping, and 1-D ambipolar diffusion in Athena; working towards implementing tracer particle routine with MHD in both Athena and Athena++
- **Data Analysis Tools:** expanded the *GRID* core-finding routine to include new capability of measuring magnetic flux and angular momentum; revised the 2-D version of *GRID*-core so it can be applied on observational data (publicly available on my personal website `http://people.virginia.edu/~cc6pg/grid_core.html`)
- **Educational Program:** designed computational lab materials in Matlab and prepared online tutorials for UMD undergraduate-level astronomy courses (see e.g. `http://people.virginia.edu/~cc6pg/MATLAB/ASTR310/`).
- **Collaboration Partnership:** member of the BLASTPol collaboration and the LMT-TolTEC Fields in Filaments Legacy Survey science team; leader of the multi-institutional GBT-Argus project on core-scale dynamics (`https://greenbankobservatory.org/science/gbt-surveys/disco-gas/`)
- **Professional Training:** PiTP Summer School in Computational Plasma Astrophysics (Institute for Advanced Study, 2016); Software Carpentry Boot Camp (AAS 225$^{\text{th}}$ meeting, 2015); `yt` Workshop (Princeton University, 2014); High Performance Computing Boot Camp (University of Maryland, 2011)

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FIRST AUTHOR PUBLICATIONS

- **Chen, C.-Y.**, Storm, S., Li, Z.-Y., et al. (2019) *Investigating the Complex Velocity Structures within Dense Molecular Cloud Cores with GBT-Argus*, MNRAS, 490, 527
- **Chen, C.-Y.**, Li, Z.-Y., King, P. K., Fissel, L. M., & Mazzei, R. (2019) *A New Method to Trace Three-dimensional Magnetic Field Structure within Molecular Clouds Using Dust Polarization*, MNRAS, 485, 3499
- **Chen, C.-Y.**, & Ostriker, E. C. (2018) *Geometry, Kinematics and Magnetization of Simulated Prestellar Cores*, ApJ, 865, 34
- **Chen, C.-Y.**, Li, Z.-Y., King, P. K., & Fissel, L. M. (2017) *Fantastic Striations and Where to Find Them: The Origin of Magnetically Aligned Striations in Interstellar Clouds*, ApJ, 847, 140
- **Chen, C.-Y.**, King, P. K., & Li, Z.-Y. (2016) *Change of Magnetic Field-gas Alignment at the Gravity-driven Alfvénic Transition in Molecular Clouds: Implications for Dust Polarization Observations*, ApJ, 829, 84
- **Chen, C.-Y.**, & Ostriker, E. C. (2015) *Anisotropic Formation of Magnetized Cores in Turbulent Clouds*, ApJ, 810, 126
- **Chen, C.-Y.**, & Ostriker, E. C. (2014) *Formation of Magnetized Prestellar Cores with Ambipolar Diffusion and Turbulence*, ApJ, 785, 69
- **Chen, C.-Y.**, & Ostriker, E. C. (2012) *Ambipolar Diffusion in Action: Transient C Shock Structure and Prestellar Core Formation*, ApJ, 744, 124

CO-AUTHORED PUBLICATIONS (⋆ Student under my supervision or co-supervision)

- King, P. K.⋆, **Chen, C.-Y.**, Fissel, L. M., & Li, Z.-Y. (2019) *Effects of Grain Alignment Efficiency on Synthetic Dust Polarization Observations of Molecular Clouds*, accepted by MNRAS; https://arxiv.org/abs/1909.03079
- Lam, K. H.⋆, Li, Z.-Y., **Chen, C.-Y.**, Tomida, K., & Zhao, B. (2019) *Disk Formation in Magnetized Dense Cores with Turbulence and Ambipolar Diffusion*, MNRAS, 489, 5326
- Dhabal, A., Mundy, L. G., Teuben, P., **Chen, C.-Y.**, & Storm, S. (2019) *Connecting the Scales: Large Area High-Resolution Ammonia Mapping of NGC 1333*, ApJ, 876, 108
- Fissel, L. M. & 38 co-authors including **Chen, C.-Y.** (2019) *Relative Alignment Between the Magnetic Field and Molecular Gas Structure in the Vela C Giant Molecular Cloud using Low and High Density Tracers*, ApJ, 878, 110
- King, P. K.⋆, Fissel, L. M., **Chen, C.-Y.**, & Li, Z.-Y. (2018) *Modeling Dust Polarization Observations of Molecular Clouds through MHD Simulations*, MNRAS, 474, 5122
- Lee, K. I. & 23 co-authors including **Chen, C.-Y.** (2014) *CARMA Large Area Star Formation Survey: Structure and Kinematics of Dense Gas in Serpens Main*, ApJ, 797, 76
- Storm, S. & 24 co-authors including **Chen, C.-Y.** (2014) *CARMA Large Area Star Formation Survey: Project Overview with Analysis of Dense Gas Structure and Kinematics in Barnard 1*, ApJ, 794, 165