

Adjunct Prof, U Denver  
Research Scientist,  
Blue Marble Space Inst. of Science

**Mark C. Neyrinck**  
Curriculum Vitæ

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### *Principal Achievements*

- **Discovery of rotating intergalactic filaments through my ‘origami’ and ‘cosmic spiderweb’ descriptions of cosmic structure formation**, as featured in a NOVA program
- Identified connections between the structure and formation of **branching structures such as trees, tree canopies, and river networks**
- I pioneered **techniques to detect and analyze cosmic voids** for cosmological constraints, through the standard void-finder ZOBOV; using this, we made the **first detection of the cold imprints of voids** on the **cosmic microwave background**, a **sign of dark energy**.
- I have made **statistical advances, such as a log-transform** to simplify large-scale-structure analysis, related to computer vision and image processing, of wide interest outside astronomy as well
- **In turbulence on astronomical scales, identified maximum eddy sizes with galaxy size, and how that depends on location.** Interested in **how information is gained or lost in the cosmos**

### *Employment*

<b>Adjunct Professor</b> , Physics & Astronomy Dept, University of Denver	<i>Spring 2024</i>
<b>Research Scientist</b> , Blue Marble Space Institute of Science	<i>Feb 2024-Present</i>
<b>Computational protein-interaction consultant</b> , Denver	<i>Summer 2023-Present</i>
<b>Head of Space Physics</b> , Lexset, Inc, consulting position	<i>July 2023-Present</i>
<b>Modeling for space simulations</b> , Titan Space Technologies, LA and Boulder, CO	<i>Jan-Apr 2023</i>
<b>Ikerbasque Fellow</b> , U. Basque Country, Spain	<i>Apr 2018-Apr 2023</i>
<b>Postdoctoral Researcher</b> , Durham University	<i>Summer 2016-Winter 2017</i>
<b>Visiting Scientist</b> , Institut d’Astrophysique de Paris	<i>Jan-July 2016</i>
<b>Asst, Assoc. Research Scientist</b> , Johns Hopkins	<i>Summer 2011-Summer 2016</i>
<b>Course Instructor</b> , “Origami Mathematics and Cosmology”, JHU	<i>Intersession, Jan 2015</i>
<b>W. M. Keck Fellow</b> , Johns Hopkins University	<i>Fall 2008-Summer 2011</i>
<b>Postdoctoral Researcher</b> , Institute for Astronomy, U. of Hawaii	<i>Fall 2005-Summer 2008</i>
<b>Course Instructor</b> , “Black Holes”, APS Dept., U. of Colorado	<i>Summer 2005</i>
<b>Research Assistantship</b> , JILA, Univ. of Colorado	<i>Summer 2000-Fall 2004</i>
<b>Teaching Assistantship</b> , APS Dept., U. of Colorado	<i>Fall 2000, Fall 2002, Spring 2005</i>
<b>Teaching Assistantship</b> , Math Dept., U. of Chicago	<i>1997-1998, 1999-2000</i>

### *Education*

**Ph.D. Astrophysics, University of Colorado at Boulder (Thomas Award)**  
Ph.D. Thesis: “Illuminating the Tips of Dark-Matter Icebergs”  
Advisors: Andrew J. S. Hamilton, Nickolay Y. Gnedin

**M.S. Astrophysics, University of Colorado at Boulder (High Pass)**

**B.A. Physics, w/spec. in Astr, University of Chicago (Honors; Lewis Prize)**

**Mathematics, Part IB, Pembroke College, Cambridge University**

**Terra.do Learning for Action, Software for Climate certificates for climate science and mitigation**

*Popular Media Attention for Work*

- [“Bringing the Cosmic Web Down to Earth with Mark Neyrinck,”](#) Big Impact Astronomy Podcast, Feb 2025
- "[Milky Way Bigger Than It Should Be,](#)" *Newsweek*, 24 Jan 2023  
[Several other articles on the same topic]
- [“Cosmic filaments may be the biggest spinning objects in space,”](#) *Science News*, 22 June 2021  
[Several other articles on the same topic]
- [“Art of the Cosmos: Understanding galaxies through origami,”](#) *Artful Science* interview, Jun 2021  
Interview, SciArt Magazine, August 2020
- [“The Cosmic Web that Connects Galaxies Together May Be Spinning,”](#) *New Scientist*, 16 June 2020  
Paper-folding, dark matter and the structure of the universe, Science Gallery Dublin podcast, Apr 2020  
Interview and segment about origami and cosmology in NOVA episode “The Origami Revolution,”  
<https://rmpbs.pbslearningmedia.org/resource/buac17-912-sci-ess-nvtorcosmicfold/wgbh-nova-the-origami-revolution-cosmic-folding/>
- [“The Cosmic Spiderweb on Dark-Matter-Haloes’ Eve”](#) invited blog post, *The Huffington Post*

*Selected Presentations, Workshops, and Invitations*

- Seminar, Institute for Astronomy, U Hawaii at Mānoa *Feb 2025*
- Talk, “Cosmic Flows 2025: Probing the Universe with Peculiar Velocities,”  
Brisbane, Australia *Feb 2025*
- Invited talk, “Mind the Gap: Galaxies and the Large-Scale Structure”,  
Córdoba, Argentina *Dec 2024*
- Water in the West Symposium, CSU Spur, Denver, Colorado, USA *Nov 2024*
- Talk, “Arts and Sciences: The Nature of Information” conference, Telluride, CO *Jul 2024*
- SciArt Into the Realms of Possibility, a LASER Panel,  
Bradbury Science Museum, Los Alamos *Jun 2024*
- Lectures, art in Forest Ecosystems class, with Prof Erika Osborne  
Colorado State University Mountain Campus *Jun 2024*
- Talk, “Simplifying Nature Through Origami and AI” Denver Data-Science Meetup *May 2024*
- JHU/Simons Turbulence Group seminar *Mar 2024*
- Seminar “The Boundary of Chaos in the Cosmos”, Institute for Astronomy, Edinburgh *Apr 2023*
- Co-organizer, workshop “Varieties of Indeterminism”, Les Diablerets, Switzerland:  
[“Where the cosmos is chaotic or indeterministic”](#) *Apr 2023*
- 5-week participation in “The Cosmic Web: Connecting Galaxies to Cosmology”, KITP,  
Santa Barbara, [Swirls, Information and Eddies, Cosmic and Chaotic](#) *Feb-Mar 2023*
- Science Foo Camp (virtual) presentation, organized by Google/O’Reilly Media/Nature  
[“The Biggest Rotating Things in the Cosmos”](#) *July 2021*

*Outreach, Science/Art Activities* (hyperlinks in blue)

- Art installation in “Into the Realms of Possibility,” science-art show at  
Fuller Lodge Art Center, Los Alamos *Jun-Jul 2024*
- Fabric-Folding Cosmic Web Workshop, Dragon Boat Festival, Denver *July 2022, 2023*

*Selected Publications:* h-index 35, > 6100 total citations (according to [Google Scholar](#))

(*blue text is linked to abstracts*)

1. Cai & **Neyrinck**, 2025, submitted, “Cosmology with Cosmic Voids”, entry in Encyclopedia of Astrophysics, ed. Howlett et al. Springer
2. Xia, **Neyrinck**, Cai & Aragon-Calvo, 2021, MNRAS, 506, 1059  
[Intergalactic Filaments Spin](#)