

# Ka Chun Yu

## Full Curriculum Vitae

(5/2019)

Denver Museum of Nature & Science  
2001 Colorado Blvd.  
Denver, CO 80205-5798  
(303) 370-6394  
kcyu@dmns.org

**Webpages:** Google Scholar  
ResearchGate  
Academia.edu  
LinkedIn  
DMNS

### Professional Preparation

|                                     |   |      |
|-------------------------------------|---|------|
| University of Colorado, Boulder, CO | Astrophysical, Planetary, & Atmospheric Sciences, Ph.D    | 2000 |
| University of Arizona, Tucson, AZ   | Astronomy and Physics double major, B.Sc, Magna Cum Laude | 1992 |

### Appointments

|                    |   |            |
|--------------------|---|------------|
| Jan 2017–present:  | Department Chair, Space Science   | DMNS       |
| May 2004–present:  | Curator of Space Science  | DMNS       |
| Jan 2001–May 2004: | Scientific Visualization Developer and Interpreter  | DMNS       |
| 2000–2001:         | Star Formation Postdoctoral Research Associate, Center for Astrophysics & Space Astronomy | UC-Boulder |
| 1992–2000:         | Research Assistant, Center for Astrophysics & Space Astronomy                             | UC-Boulder |
| 1994–1999:         | Teaching Assistant, APAS Department   | UC-Boulder |

### Grant Awards

|           |  |             |
|-----------|--|-------------|
| 2015–2021 | Co-I, NASA Science Education CAN (NNH15ZDA004C), “OpenSpace – An Engine for Dynamic Visualization of Earth and Space Science for Informal Education and Beyond,”                                 | \$58,446    |
| 2010–2015 | Co-I, NSF DRL Discovery Research K-12 (1020386), “Efficacy Study of Metropolitan Denver’s Urban Advantage Program: A Project to Improve Scientific Literacy Among Urban Middle School Students,” | \$3,414,037 |
| 2010–2013 | PI, NOAA ELG (NA10SEC0080011), “The Worldview Network: Ecological Programming for Digital Planetariums and Beyond”   | \$1,249,870 |
| 2009–2010 | Co-PI, NSF DRL (0848945 Supplemental), “Evaluating Astronomy Learning in Immersive Virtual Environments,”  | \$66,128    |
| 2009–2014 | Co-I, NASA CP4SMP+ (NNX09AL70G), “Methods of Increasing Awareness of Comparative Planetology and Climate Science with Science On a Sphere in Museum Settings”                                    | \$820,866   |
| 2005–2007 | Co-PI, NSF REC (0529522), “Evaluating Astronomy Learning in Immersive Virtual Environments”  | \$348,990   |

### External Service

- Big ACT Dome+ Advisory Board (2018–present)
- IMERSA Advisory Council (2018–present)
- OpenSpace Advisory Board (2016–present)
- IMERSA Publications Strategy Committee Chair (2016)

- IPS Education Committee (2014–present)
- IPS Science and Data Visualization Task Force (2013–present)
- Reviewer for *International Journal of Science Education*, *Curator*, *Eurographics 2010*, *International Journal of Digital Earth*, *Physical Review: Physics Education Research*, *Sustainability*, *3rd International Symposium on Visual Computing (ISVC07)*

## Internal Service

- DMNS *Space Odyssey Reimagined* team (2018–present)
- DMNS/Colorado Mills Mall *Mars Outpost* Playspace (2018–2019)
- DMNS Inclusivity Statement Committee (2018–present)
- DMNS Curator for Scientific Instruments Collection (2017–present)
- DMNS Technology in Guest Experiences Focus Group (2017–present)
- DMNS Teens Science Scholars Advisory Committee (2015–present)
- DMNS Community Voices/No Walls Initiative (2014–2015)
- DMNS Youth & Teacher Initiative Team (2008–2010)
- DMNS WILD Committee (2007–2014)
- DMNS Inclusiveness Committee (2007–2010)
- DMNS Adult Programs Coordinator Search Committee (2010)
- DMNS Health Science Curator Search Committee (2005–2006)
- DMNS Gates Planetarium Operations Team (2001–present)

## Review Panels

1. 2018: NOAA
2. 2018: NSF
3. 2017: NSF
4. 2017: LSST EPO
5. 2016: NASA
6. 2016: NSF
7. 2015: NOAA
8. 2015: NSF
9. 2010: NOAA
10. 2008: NOAA

## Conferences Organized

1. 23–24 Aug 2016, *Immersive Education Summit 2016*, Denver, CO; co-organizer
2. 3–5 Sep 2008, *Viewing the Universe via the World Wide Web*, a World Wide Telescope/Google Sky workshop, KICP/University of Chicago, Chicago, IL; co-organizer
3. Summer, 2008, *4th International Symposium on Visual Computing (ISVC08)*, Lake Tahoe, CA; Virtual Reality co-chair
4. 1–6 Jul 2007, *Gordon Research Conference on Science Visualization in Education*, Bryant University, RI; organizer for session “Creating Effective Visual Presentations for Museum Audiences and Informal Learning”

## Teaching

1. *Scientists in Action: Tour of the Universe*, DMNS Distance Learning Class, 26 Feb 2016
2. *Scientists in Action: Tour of the Universe*, DMNS Distance Learning Class, 25 Feb 2016
3. *Hubble Space Telescope Discovery Workshop*, DMNS, 4 Aug 2007
4. *Introduction to Cosmology*, Lifelong Learning Class, DMNS, Oct 2005
5. *Introduction to Astronomy*, Lifelong Learning Class, DMNS, Sep–Nov 2004
6. *ASTR 3740, Relativity & Cosmology* Lecturer, APAS, University of Colorado, Spring 2001
7. *ASTR 1010* Laboratory Teaching Assistant, APAS, University of Colorado, Spring 1994–Spring 1999

## Student Interns and Volunteers Mentored

Opal Harbour (Jun–Aug 2014), Laurie Budke (Feb–Jul, 2013), Lillian Anderson (Feb–Apr, 2013), Cooper Wooten (Jan 2013–Jul 2016), Suleimon Jenkins (Nov 2013–Feb 2014), Kyla Killinger (Sep–Nov 2012), Lucy Conklin (Jul–Aug 2012), Nathan Kaplan (Sep–Nov 2010), Nicolas Ortiz (Feb–Apr 2010), Molly Cheek (Sep–Nov 2009), Abysolome Asmerom (Mar–May 2009), Lydia Hooper (Jan–May 2009), Beau Brown (Jan–Mar 2009), Ian Clanton-Thuon (Mar–May 2007), Jan Warnstam (Mar–May 2007).

## Software Projects

1. *Cosmic Atlas* (2001–2004)
2. *Cosmic Atlas Galaxy Flythrough* (2003–2004)
3. *IMAGE\_PAN / IMP* (2003–2005)
4. *vPresent* (2007–2009)
5. *gallery* (2009–2011); current release: 0.9.106 beta
6. *marinos* (2011–2012); current release: 0.12.293
7. *speckify* (2009–2013); current release: 0.13.127 beta; see Sourceforge.net
8. *panocto* (2011–2014); current release: 0.13.042 beta

## Professional Organizations

American Astronomical Society (AAS), International Planetarium Society (IPS), Immersive Media, Entertainment, Research, Science & Arts (IMERSA), IEEE, American Alliance of Museums (AAM), Association of Computing Machinery (ACM), American Geophysical Union (AGU)

## Research Interests

### Scientific Research: Learning in Planetariums

My NSF grants for the Astronomy Learning in Immersive Virtual Environments (NSF REC 0529522, DRL 0529522 Supplemental) project investigated how immersive virtual environments in the form of digital planetariums could be incorporated into formal college astronomy education, and the type of learning that such environments make possible. This collaboration with the Metropolitan State University of Denver (MSUD) uncovered alternative conceptions about astronomical topics (Yu et al. 2010). More generally, it showed that digital full-dome planetariums are effective at improving learning gains, especially when compared to the same visual content shown on non-immersive flatscreens in a regular classroom. In addition, the dome may be reducing the cognitive load of viewers for topics that required spatial understanding (Yu et al. 2015); revealed that wide fields-of-view and large screens in planetariums may be increasing viewer attention resulting in improved learning (Yu et al. 2016); and affirmed the educational value of the *Powers of Ten*-style zooms and physical solar system scale models (Yu et al. 2017b). The increased attention due to optic flow stimulating a viewer's peripheral vision may have implications for current and future generations of head-mounted displays that are used for virtual reality (Yu et al. 2017a).

## Scientific Research: Star Formation

My thesis astronomical research involved the observational study of outflows from young stellar objects, via a multi-wavelength approach that combined single-dish and interferometric millimeter and sub-millimeter observations (which probe the colder molecular gas), with near-infrared  $v = 1-0 S(1) \text{ H}_2$  imaging and spectroscopy (which trace the interface between molecular flows and atomic winds and jets from the young star), and optical narrowband imaging and spectroscopy of Herbig-Haro objects. These different datasets allowed regions with varying excitation conditions to be probed, with consequences for outflow acceleration models, molecular gas entrainment, and jet shock interactions with ambient cloud gas in OMC-2/3 (Yu et al. 1997, Yu et al. 2000) and the Barnard 5 cloud (Yu et al. 1999). My other research includes observational studies of jets around young stellar objects using HST NICMOS (Reipurth et al. 1999b, Reipurth et al. 2000a, Reipurth et al. 2000b), high mass star formation (Bally et al. 1998b, Shepherd et al. 2000), and survey work (Reipurth et al. 2004, Kumar et al. 2002). More recently, I have been involved in an ongoing near-infrared photometric and spectroscopic study of the nearby high-mass star forming region W40 (Shuping et al. 2012).

## Astronomy Technical Skills

My observing experience is predominantly in the near-infrared, particularly the  $v = 1-0 S(1) \text{ H}_2$  line in the  $K$  band in imaging as well as spectroscopy (Apache Point, Kitt Peak 2.1 m, Cerro-Tololo Inter-American Observatory 1.5 m, Palomar 60", Kitt Peak Mayall 4 m). Other past data reduction and analyses include WFPC2 and NICMOS imaging from HST (including imaging processing using dithering and Lucy-Richardson deconvolution techniques); single-dish radio telescopes in the sub-millimeter (SMTO Heinrich Hertz Telescope) and sub-millimeter and radio interferometers (OVRO, VLA); and a large number of observations by collaborators including optical and near-infrared spectroscopy and imaging (RCSPEC and T2KA on the Kitt Peak 0.9 m, 4 m; CSHELL at the NASA IRTF; MOSAIC images from the Kitt Peak 0.9 m and 4 m) and sub-millimeter spectroscopy ( $^{12}\text{CO } J = 2 \rightarrow 1$  maps from the NRAO 12 m;  $^{12}\text{CO}$  and  $^{13}\text{CO}$  maps from the Bell Labs 7 m).

I have also reduced and analyzed ROSAT PSPC data of the soft X-ray background (Wang & Yu 1995), and have modified Erich Grossmann's AT atmospheric transmissivity code to include Doppler broadening in its calculated line profiles (Yu & Bally 1996).

The majority of the data reduction and analysis for the above observations were accomplished via IRAF routines and personal software written in IDL, with a very small portion of the work done in MMA, MIRIAD, CLASS, GILDAS, GREG, and AIPS software packages. More recently, I have adopted R as a scientific programming language, and am writing tools with it for data reduction, analysis, and plotting.

## Education & Public Outreach Interests

### Astronomy & Physics EPO Programs

**60 Minutes in Space:** 50+ talks as part of a monthly series with in-depth reporting of current astronomy, planetary science, and spaceflight news. I identified stories for the month; re-purposed imagery and created new visuals (which may include developing datasets for the planetarium, or re-editing videos); and then presented the stories to the public.

**Science Lounge:** 15+ talks in this monthly night-time event for adults 21+ yrs. old. Each evening is uniquely themed, with recent astronomy-related topics including *Total Solar Eclipse*, *Time Travel*, and *Pluto Party*. Visitors can see live talks and demonstrations, participate in hands-on activities, and snacks and drink in hand. My live talks use pop culture to help connect audiences with the science story, such as the hazards of human spaceflight via examples from a Hollywood film in "Death by Space: *The Martian* Edition."

**Tours of the Universe:** 80+ live tours through the virtual universe, with flightpaths based on audience requests. The venues ranged from permanent and portable digital planetariums, to DMNS' *Space Odyssey* exhibit floor, to classrooms around the country via a distance learning stream.

**Planetarium Show Production:** 13+ planetarium shows (both live and rendered), with roles that include science advising, scriptwriting, story, visualization development, and other production tasks.

**Life Out There:** an astrobiology-themed live performance planetarium show co-developed with David Grinspoon and the House Band to the Universe (Yu, Demarines, & Grinspoon 2014). I curated the astrophysics content, created and programmed visuals for the real-time planetarium software, and "flew" the multimedia experience for performances in Denver, Washington, DC, Chicago, and Jackson, WY.

**Professional Development:** ~ 30 training sessions and 16 articles for DMNS staff and volunteer docents on astronomy and physics topics; ~ 20 presentations at teacher professional development workshops.

**Sci-Fi Film Series,** where a local film professor and DMNS scientist lead post-screening discussions of the scientific and cinematic aspects of the film. I have been involved with viewings and analyses of *Moon*, *Europa Report*, *Monsters*, *The Matrix*, *Blade Runner*, and *Arrival*.

### **Earth Systems Science and Global Environmental Change EPO Programs**

**Digital Earth:** 50+ presentations that use planetarium visualization software to explore Earth from a space-based perspective; tasks include co-producing, co-development of stories, visualization development, and live flight. Productions were co-created with researchers from other disciplines who provided the stories and relevant geospatial data for topics in archaeology, biodiversity, geography, geology, paleontology and other Earth systems sciences. Visitor evaluations from these events showed that the planetarium was an especially compelling and memorable venue for Earth stories (Yu 2009, Yu et al. 2009, Yu et al. 2011).

**Science On a Sphere:** co-investigator (co-I) of NASA CP4SMP+ grant (NNX09AL70G) funded project, involving installation of a *Science On a Sphere*, and production of two climate change stories using a comparative planetology approach. The *marinos* tool for creating latitude-corrected image textures was developed for this project.

**Worldviews Network:** principal investigator (PI) and co-founder of NOAA-funded project (NA10SEC0080011) that partnered scientists, artists, and educators using immersive planetarium visualizations to engage communities in dialogues about resilience to global environmental change (Yu et al. 2012, Sickler & Hayde 2016). We collaborated with informal educators and external advisers from across the country on 12+ stories that situate local concerns within planetary and cosmic contexts across multiple spatial, temporal, and spectral scales. The live presentations and videos have been seen by 10,000+ people. Production tasks include: establishing external partnerships, story development, scriptwriting, visualization development, photography, live presentations, and technical support. Professional development for informal science education staff include organizing visualization assets, storyboards, and narratives through the worldviews.net portal, and using Google Hangouts to create 10 YouTube videos as a resource for creating visualization products or to learn more about specific programs.

### **Communicating Science for Informal Audiences**

My DMNS education efforts have given me broad experience in communicating to different informal audiences in a wide variety of formats, settings, and contexts. In addition to the experience of preparing and delivering over 600 talks, I have also studied and through participation in DMNS' Youth & Teacher Initiative, learned about the critically different approaches needed for informal education, and how formal standards-based approaches (e.g., the Next Generation Science Standards) can still inform informal education practice.

I have worked with DMNS' communications and media manager to improve my presentation skills for TV and radio. A 2-day Alan Alda Center for Communicating Science workshop has allowed me to hone my skills for communicating effectively to and connecting personally with the public.

My study of research-based best practices in visual communication (e.g., based on human perception, cognitive overload, and multimedia design) has informed the way that I create my own visuals for public presentations and for plots in scientific papers. Recently I explored what strategies are most effective for filmmaking for planetariums (Yu, Neafus, & Wyatt 2016, 2017).

### **Innovative Technologies and Media for Learning**

I have been involved in the development of innovative tools for visualization and science communication ever since I started at DMNS. These include visualization software, production tools, and astrophysical datasets for planetariums:

- **Cosmic Atlas:** scientific programmer for the real-time, interactive astronomy spaceflight simulator and show-production tool for a multi-channel full-dome planetarium (Yu & Jenkins 2004); activities include writing and converting code for orrery calculations (database look-up, analytical functions, solving Kepler's equation); loading and manipulating astronomical databases; and designing a Milky Way Galaxy model with realistic stellar populations and molecular clouds generated with procedural noise techniques. (C, Performer OpenGL)
- **Immersive Model Presentation (IMP):** real-time visual data viewer. (C, Performer OpenGL)

- **speckify**: open source software for converting ASCII astrophysical databases into visualization modules for planetarium visualization software, and available at Sourceforge.net. (C++, FLTK)
- **gallery, panocto**: open source software for creating galleries of astronomical images and spherical panoramas for Uniview. (perl)
- **marinos**: open source bash script for creating latitude-corrected overlay textures that are placed onto an equirectangular texture map for spherical bodies (bash, ImageMagick++)
- **Open datasets**: 10+ license-free modules for astrophysical datasets

I have experience with the following equipment for fulldome and VR image capture:

- **Spherical panorama stills**: Canon EOS 5D Mk III; Canon EF 15 mm f/2.8 Fisheye lens; PTGui Pro photos-titching software
- **Virtual reality video**: Kodak PixPro SP360

### Reaching Underserved and Underrepresented Groups

I have been long interested in reaching audiences that have traditionally been underserved or underrepresented in the sciences. Activities along these lines include:

1. **Inclusiveness Committee**: a long-term, institution-wide process to promote inclusiveness internally, and diversify the ethnic and economic make-up of DMNS visitors. My participation included helping to write the report *Blueprint for Inclusiveness: Plans to Meet a Strategic Objective* (2009), which identified the demographic changes occurring in the Denver metro area, and made recommendations for inclusiveness training and other activities to make the institution more diverse and welcoming to underserved audiences.
2. **Teen Science Scholars Advisory Committee**: help develop guidelines for the Teen Science Scholars program, a DMNS internship for high school students with the goal of increasing participation in scientific careers by those who have been traditionally underrepresented.
3. **Mentoring High School Interns** via both a dedicated internship program with the Denver School of Science and Technology, and also through the Teen Science Scholars program. I have worked with nine students who were women and/or persons of color.
4. **Native American Outreach** through participation in the NSF-funded *Cosmic Serpent* program (which encourages partnerships that bring together indigenous and Western science perspectives in science museums); and facilitating the development of indigenous stories and events geared towards Native American tribes in the Worldviews Network.

### Recent Collaborators

David McConville (The Elumenati), Ned Gardiner (NOAA), Healy Hamilton (NatureServe), Rachel Connolly (WGBH/NOVA), Kamran Sahami (MSUD), Ralph Shuping (Space Science Institute), David Grinspoon (Planetary Science Institute), Dan Neafus (DMNS), Bob Reynolds (DMNS), Ryan Wyatt (California Academy of Sciences), Kenji Williams (Remedy Arts, Inc.).

### Publications

#### Refereed Papers

1. **Yu, K.C.**, Sahami, K., & Dove, J. 2017, "Learning About Scale of the Solar System Using Digital Planetarium Visualizations," *American Journal of Physics*, **85**(7), pp. 550-556. <http://dx.doi.org/10.1119/1.4984812>
2. **Yu, K.C.**, Sahami, K., Sahami, V., Sessions, L., & Denn, G. 2017, "Group Immersive Education with Digital Fulldome Planetariums," *2017 IEEE Virtual Reality (VR) Proceedings*, Eds. E.S. Rosenberg, D.M. Krum, Z. Wartell, B. Mohler, S.V. Babu, F. Steinicke, & V. Interrante, March 18-22, 2017, Los Angeles, CA, pp. 238-239.

3. **Yu, K.C.**, Sahami, K., Denn, G., Sahami, V., & Sessions, L. 2016, “Immersive Planetarium Visualizations for Teaching Solar System Moon Concepts to Undergraduates,” *Journal of Astronomy & Earth Science Education*, **3**(2), pp. 93–110. <http://dx.doi.org/10.19030/jaese.v3i2.9843>
4. **Yu, K.C.**, Sahami, K., Sahami, V., & Sessions, L. 2015, “Using a Digital Planetarium for Teaching Seasons to Undergraduates,” *Journal of Astronomy & Earth Science Education*, **2**(1), pp. 33–50. <http://dx.doi.org/10.19030/jaese.v2i1.9276>
5. Shuping, R.Y., Vacca, W.D., Kassis, M., & **Yu, K.C.** 2012, “Spectral Classification of the Brightest Objects in the Galactic Star-forming Region W40,” *The Astronomical Journal*, **144**(4), pp. 116–127. <http://stacks.iop.org/1538-3881/144/i=4/a=116>
6. **Yu, K.C.**, Sahami, K., & Denn, G. 2010, “Student Ideas about Kepler’s Laws and Planetary Orbital Motions,” *Astronomy Education Review*, **9**, 010108, <http://dx.doi.org/10.3847/AER2009069>
7. **Yu, K.C.** Dec 2009, “Digital Planetariums for Geology and Geography Education: Earth Visualizations at the Gates Planetarium,” *The Planetarian*, **36**(3), pp. 6–12, 64.
8. **Yu, K.C.**, Williams, K., Neafus, D., Gaston, L., & Downing, G. 2009, “*Gaia Journeys*: A Museum-based Immersive Performance Exploration of the Earth,” *International Journal of Digital Earth*, **2**(1), pp. 44–58. <http://dx.doi.org/10.1080/17538940902745951>
9. Neafus, D., & **Yu, K.C.** 2007, “Performing and Visual Arts, The Sciences: Visualization brings them together at the Gates Planetarium,” *The Planetarian*, **36**(3), pp. 6–17.
10. **Yu, K.C.**, Brownell, M., Schoemer, J., Neafus, D., Lucas, T. & Zager, Z. 2007, “Live Action Film Footage for an Astronomy Fulldome Show,” *The Planetarian*, **36**(1), pp. 6–17, 86–87.
11. Reipurth, B., **Yu, K.C.**, Moriarty-Schieven, G., Bally, J., Aspin, C., & Heathcote, S. 2004, “Deep Imaging Surveys of Star-forming Clouds. I. New Herbig-Haro Flows in NGC 2264,” *Astronomical Journal*, **127**, pp. 1069–1080.
12. Nanda M.S., Kumar, Anandarao, B.G., & **Yu, K.C.** 2002, “Ongoing Star Formation Activity in the L1340 Dark Cloud,” *Astronomical Journal*, **123**, pp. 2583–2589.
13. **Yu, K.C.**, Billawala, Y., Smith, M.D., Butner, H., & Bally, J. 2001, “Erratum: A Multi-wavelength Study of Outflows in OMC-2/3,” *Astronomical Journal*, **121**, p. 1214.
14. **Yu, K.C.**, Billawala, Y., Smith, M.D., Butner, H., & Bally, J. 2000, “A Multi-wavelength Study of Outflows in OMC-2/3,” *Astronomical Journal*, **120**, pp. 1974–2006.
15. Reipurth, B., **Yu, K.C.**, Heathcote, S., Bally, J., & Rodríguez, L.F. 2000, “Hubble Space Telescope NICMOS Images of Herbig-Haro Energy Sources: [FeII] Jets and Binarity,” *Astronomical Journal*, **120**, pp. 1449–1466.
16. Shepherd, D.S., **Yu, K.C.**, Bally, J., & Testi, L. 2000, “A CO, <sup>13</sup>CO, C<sup>18</sup>O and C<sup>17</sup>O Interferometric and IR Imaging Study of the Luminous Young Outflow IRAS 20126,” *Astrophysical Journal*, **535**, pp. 833–846.
17. Reipurth, B., Heathcote, S., **Yu, K.C.**, Bally, J., & Rodríguez, L.F. 2000, “Hubble Space Telescope NICMOS and WFPC2 Images of the HH 1 Jet: A Comparative Study,” *Astrophysical Journal*, **534**, pp. 317–323.
18. Reipurth, B., **Yu, K.C.**, Bally, J., & Rodríguez, L.F. 1999, “Multiplicity of the HH 111 Jet Source: Hubble Space Telescope NICMOS Images and VLA Maps,” *Astronomy & Astrophysics*, **352**, pp. L83–L86.
19. **Yu, K.C.**, Billawala, Y., & Bally, J. 1999, “Parsec-scale CO and H<sub>2</sub> Jets in Barnard 5,” *Astronomical Journal*, **118**, pp. 2940–2961.
20. Bally, J., **Yu, K.C.**, Rayner, J., & Zinnecker, H. 1998, “Hubble Space Telescope WFPC2 Observations of the Young Bipolar HII Region S106,” *Astronomical Journal*, **116**, pp. 1868–1881.
21. **Yu, K.C.**, Devine, D., & Bally, J. 1997, “Shock-Excited H<sub>2</sub> Flows in OMC-2 and OMC-3,” *Astrophysical Journal*, **485**, pp. L45–L48.
22. **Yu, K.C.**, & Bally, J. 1996, “Extrasolar Planet Detection at Infrared Wavelengths from the Earth,” *Journal of Geophysical Research: Planets*, **101**, pp. 14843–14852.
23. Wang Q.D., & **Yu, K.C.** 1995, “Shadowing the Soft X-ray Background by Infrared Cirrus: A Study of Selected Regions,” *Astronomical Journal*, **109**, pp. 698–708.

### Invited Papers

1. Plummer, J.D., Schmoll, S., **Yu, K.C.**, & Ghent, C. 2015, "A Guide to Conducting Educational Research in the Planetarium," *The Planetarian*, **44**(2), pp. 8–24, 30.
2. **Yu, K.C.**, Hamilton, H., Connolly, R., McConville, D., & Gardiner, N. 2012, "The Worldviews Network: Planetariums for Ecological Literacy," *ASTC Dimensions*, pp. 42–43.
3. Colwell-Chanthaphonh, C., **Yu, K.C.**, & Powell, J. Mar/Apr 2011, "Native American Sciences Initiative: Deepening Relationships and Expanding the STEM Workforce," *ASTC Dimensions*, issue 12–13.
4. **Yu, K.C.**, & Sahami, K. 2007, "Digital Planetariums for Astronomy Education," *ASTC Dimensions*, Nov/Dec 2007, pp. 11–12.
5. **Yu, K.C.** Sep 2005, "Digital Full-Domes: The Future of Virtual Astronomy Education," *The Planetarian*, **34**(3), pp. 6–11.

### Edited Books

1. Bebis, G., Boyle, R., Parvin, B., Koracin, D., Remagnino, P., Porikli, F., Peters, J., Klosowski, J., Arns, L., **Yu, K.C.**, Rhyne, T.-M., Monroe, L. (Eds.), 2009, *Advances in Visual Computing: 4th International Symposium, ISVC 2008, Las Vegas, NV, USA, Dec 1–3, 2008, Proceedings, Part II*, Series: Lecture Notes in Computer Science, Vol. 5359, Berlin/Heidelberg: Springer.

### Unrefereed Papers, Abstracts, Reports, and Other Publications

1. **Yu, K.C.**, Pequette, N., Sands, S., Neafus, D., & Mancari, G. 2018, "Space Tours Live! Audience Choice for a Live Planetarium Show," *The Planetarian*, **47**(4), pp. 24–30, 54.
2. **Yu, K.C.**, & Shuping, R. 2018, "Characterizing the W40 Cluster Region with the UKIDSS Galactic Plane Survey," *American Astronomical Society: AAS Meeting #231*, 448.04.
3. Kakadelis, S., Bardeen, M., Dubois-Felsmann, G., Shupla, C., Simmons, B., & **Yu, K.C.** 2017, "Large Synoptic Survey Telescope Education and Public Outreach Review," Committee Report for LSST, September 26–28, 2017, Tucson, AZ.
4. **Yu, K.C.**, Neafus, D., & Wyatt, R. 2017, "Filmmaking for the Fulldome: Best Practices and Guidelines for Immersive Cinema (Part II)," *The Planetarian*, **46**(1), pp. 24–30, 32, 34, 36.
5. **Yu, K.C.**, Neafus, D., & Wyatt, R. 2016, "Filmmaking for the Fulldome: Best Practices and Guidelines for Immersive Cinema (Part I)," *The Planetarian*, **45**(4), pp. 26–32, 34, 36, 38–39.
6. **Yu, K.C.** 2016, "Teaching Scale with a Digital Planetarium," *Revolve IPS 2016: Proceedings of the 23rd International Planetarium Society Conference*, 19–24 June, 2016, Warsaw, pp. 47–48.
7. Ghent, C., Schmoll, S., **Yu, K.C.**, & Plummer, J. 2016, "Conducting Research in the Planetarium," *Revolve IPS 2016: Proceedings of the 23rd International Planetarium Society Conference*, 19–24 June, 2016, Warsaw, pp. 106–107.
8. **Yu, K.C.**, & Sahami, K. 2016, "Using Realistic Fulldome Visuals to Teach About Solar System Moons," *Revolve IPS 2016: Proceedings of the 23rd International Planetarium Society Conference*, 19–24 June, 2016, Warsaw, p. 104.
9. **Yu, K.C.** 2016, "The Power of Immersion in Digital Fulldome: A Look at Teaching Seasons to Undergraduate Students," *The Planetarian*, **45**(2), pp. 12–14, 24.
10. **Yu, K.C.**, & Sahami, K. 2015, "Digital Planetariums and Immersive Visualizations for Astronomy Education," *Celebrating Science: Putting Education Best Practices to Work*, ASP Conference Series, Vol. 500. Proceedings of a conference held in Burlingame, CA, 2014, G. Schultz, S. Buxner, L. Shore, & J. Barnes (Eds.), pp. 137–141.
11. **Yu, K.C.**, Demarines, J., & Grinspoon, D. 2014, "It's Life Out There: An Astrobiological Multimedia Experience for Digital Planetariums," *The Planetarian*, **43**(4), pp. 22–26, 28.
12. **Yu, K.C.**, Emmart, C., & Thompson, R. 2014, "Planetariums for Community Dialogues on Ecological Resilience to Global Change: Case Studies, Evaluation Results, & Dissemination Products," *Proceedings of the 22nd International Planetarium Society Conference*, 23–27 June, 2014, Beijing, p. 106.



13. **Yu, K.C.**, McConville, D., Gardiner, N., Hamilton, H., Irving, L., Koontz, K., & Mancari, G. 2014, "Production Pipeline for Real-Time Planetarium Presentations of Global Change Topics," *Proceedings of the 22nd International Planetarium Society Conference*, 23–27 June, 2014, Beijing, pp. 107–115.
14. **Yu, K.C.**, & Sahami, K. 2014, "Immersive Full-dome versus Non-Immersive Displays for Teaching Seasons," *Proceedings of the 22nd International Planetarium Society Conference*, 23–27 June, 2014, Beijing, pp. 102–105.
15. Kwasnitschka, T., **Yu, K.C.**, & Turk, M. 2014, "The ground beneath our feet: Earth sciences in the planetarium," *The Planetarian*, **43**(2), pp. 47–50.
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22. **Yu, K.C.**, & Grinspoon, D. 2013, "Life Out There: An Astrobiological Multimedia Experience for the Digital Planetarium," *Communicating Science: A National Conference on Science Education and Public Outreach*, ASP Conference Series, Vol. 473, proceedings of a conference held in Tucson, AZ, 4–8 Aug 2012, J. Barnes, C. Shupla, J.G. Manning, & M.G. Gibbs (Eds.), San Francisco: Astronomical Society of the Pacific, pp. 259–262.
23. **Yu, K.C.**, Hamilton, H., McConville, D., Connolly, R., Gardiner, N., & Wyatt, R. 2012, "The Worldviews Network: Initial Evaluation Results from Bioregional Community Dialogues" poster, NASA-NOAA-NSF CCEPI Meeting, Arlington, VA, 17–20 Apr 2012.
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32. DMNS Youth and Teacher Initiative Committee, Jan 2009, *Youth and Teacher Initiative Feasibility Study*, Denver Museum of Nature & Science, 18 pp.
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34. **Yu, K.C.** 2008, "Future directions for research: Media aesthetics and fulldome filmmaking," *Fulldome Summit Proceedings*, 2008 Fulldome Summit, Chicago, Illinois, 3 Jul 2008.
35. **Yu, K.C.** 2008, "Fulldome Large for Immersive Virtual Astronomy Education," *International Planetarium Society Proceedings*, 2008 IPS Meeting, Chicago, Illinois, 27 Jun–2 Jul 2008, pp. 271–278.
36. **Yu, K.C.**, & Sahami, K. 2007, "Visuospatial Astronomy Education in Immersive Digital Planetariums," *Communicating Astronomy with the Public 2007 Proceedings*, L.L. Christensen, M. Zoulias, I. Robson (Eds.), pp. 242–245.
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### **Storytelling with Uniview Column**

1. #01 Scale in the Solar System (13 Feb 2014)
2. #02: Structure of the Milky Way (27 Feb 2014)
3. #03: The Shape of the Earth (5 Mar 2014)
4. #04: Gravity in Space (20 Mar 2014)
5. #05: Kepler's Laws of Planetary Motion (20 Mar 2014)
6. #06: What Makes the Earth Habitable? (26 Mar 2014)
7. #07: Touring the Far-Infrared Sky (4 Apr 2014)
8. #08: Scale in the Milky Way Galaxy (11 Apr 2014)
9. #09: Atmospheres of the Terrestrial Planets (17 Apr 2014)
10. #10: Cosmology Misconceptions Part I (1 May 2014)
11. #11: Earth's Daily Motion (9 May 2014)
12. #12: H II Regions (15 May 2014)
13. #13: Cosmology Misconceptions Part II (29 May 2014)
14. #14: The Habitable Zone (12 Sep 2014)
15. #15: Learning About the Seasons, Part I (21 Nov 2014)

### **The Science of Space Odyssey Column**

1. #1: Demise of the Rainbow (3 Apr 2015)

### **Planetarium Shows, Visualizations, and Exhibits**

1. *The Science Behind Pixar* traveling exhibit at DMNS; curatorial review; Mar–Aug 2019
2. *Mars Outpost* Playspace, Colorado Mills Mall; development and science review; Oct 2018–Apr 2019
3. *Mindbenders Mansion* traveling exhibit at DMNS; curatorial review; Mar–Jul 2018
4. *The Last Question* planetarium show; science advising and visualization development; DMNS, Apr 2017
5. *Space Tours Live!* planetarium show; science advising and story development; DMNS, Mar 2017
6. *Aurora: Lights of Wonder* planetarium show; science and script consultant; Hugmedia, Jan 2016
7. *Life Out There* science-music experience with David Grinspoon and the House Band to the Universe; live flight, visualization and story development; Adler Planetarium, Chicago, IL, 29–30 Jul 2014
8. *Life Out There* science-music experience with David Grinspoon and the House Band to the Universe; live flight, visualization and story development; Navy Memorial Theater, Smithsonian Associates, Washington, DC, 25–26 Jul 2014
9. *Bella Gaia* fulldome planetarium show by Kenji Williams; associate producer; Jun 2014
10. *Dark Universe* planetarium show; consultant; American Museum of Natural History (AMNH), New York City, NY, Nov 2013
11. *Mythbusters* traveling exhibit at DMNS; curatorial review and volunteer training; Sep 2013–Jan 2014
12. *National Parks in a Changing World*; visualizations and technical support for Worldviews Network live presentation; Gates Planetarium, Denver Museum of Nature & Science, Denver, CO and Otterbox Theater, Ft. Collins Museum of Discovery, 26 Sep 2013
13. *Bella Gaia* concert with Kenji Williams; visualization support; Gates Planetarium, DMNS, 3–4 May 2013
14. *The Search for Water: Replenishing Watersheds in the Texas Drought*; visualizations and technical support for Worldviews Network live presentation, Perot Museum of Nature and Science, Dallas, TX, 14 Sep 2013
15. *The Hidden Ocean: Visualizing the Conditions for life*; visualizations for Worldviews Network live presentation; California Academy of Sciences, San Francisco, 5 Sep 2013

16. *Life Out There* science-music experience with David Grinspoon and the House Band to the Universe; live flight, visualization and story development; Jackson, WY, 13 Jul 2013
17. *Forests, Beetles, and the Cycles of Life*; presenter, scriptwriter, science adviser, visualizations, and technical support for Worldviews Network live presentation, Denver Museum of Nature & Science, 4 Jun 2013
18. *Resilient Landscapes: The History and Future of Black Hills Floods*; scriptwriter, visualizations, and technical support for Worldviews Network live presentation, Journey Museum, 26 Mar 2013
19. *Earth, Migrations, and the Human Effect*; scriptwriter, visualizations, and technical support for Worldviews Network live presentation, Hayden Planetarium, American Museum of Natural History, New York City, NY, 18 Dec 2012
20. *The Lake Effect: Creating a Resilient Future*; scriptwriter, visualizations, and technical support for Worldviews Network live presentation, University of Michigan Natural History Museum Planetarium, Ann Arbor, MI, 3 Oct 2012
21. *A Global Water Story* Google Earth-based video and interactive Google Earth tour; credits for co-director, scriptwriting, research, and data visualization. May 2012
22. *Where Condor Meets Eagle*; scriptwriting and technical support for Worldviews Network live presentation, Augsburg Native American film Series, Minneapolis, Minnesota, 17 Mar 2012
23. *Valley Oaks: An Ecological Journey Through Time*; technical support for Worldviews Network live presentation, Morrison Planetarium, California Academy of Sciences, 8 Dec 2011
24. *Living Maps: From Cosmos to Community*, technical support for Worldviews Network live presentation, Land of Sky Regional Council, Asheville, NC, 26 Sep 2011
25. *Land Sea Air: Changing Climates*, True 3D Soundscapes + Images installation, Steelcase Gallery show by Charlie Morrow; provided quotes and video clips; 4 Columbus Circle, NYC, NY, 28 Sep 2010–15 Jan 2011
26. *Life Out There* science-music experience with David Grinspoon and The House Band to the Universe; live flight, visualization and story development; Lazos, Inc. fundraiser for Asociación Nuevo Amanecer, Denver, CO, 24 Sep 2011
27. *Life Out There* science-music experience with David Grinspoon and The House Band to the Universe; live flight, visualization and story development; Gates Planetarium, DMNS, 8 Jul 2011
28. *Life Out There* science-music experience with David Grinspoon and The House Band to the Universe; live flight, visualization and story development; Gates Planetarium, DMNS, 8 Jul 2011
29. *Life Out There* science-music experience with David Grinspoon and The House Band to the Universe; live flight, visualization and story development; Gates Planetarium, DMNS, 7 Jul 2011
30. *A Global Water Story*; presenter, scriptwriter, visualizations, photography, and technical support for Worldviews Network live presentation, Denver Museum of Nature & Science, 24 May 2012
31. *Science Bites: Large Hadron Collider* video; presenter, science adviser, and scriptwriter; released 14 May 2010
32. *The Science Lounge: Life Out There* planetarium science-music experience; live flight, visualization and story development; Gates Planetarium, DMNS, 18 Feb 2010
33. *Cosmic Journey (IV)* planetarium show; visualization developer, science adviser, and story; Denver Museum of Nature & Science, 2010
34. *Life Out There* planetarium science-music experience; live flight, visualization and story development; Gates Planetarium, DMNS, 3 Nov 2009
35. *Bella Gaia* multimedia show by Kenji Williams; astrophysical visualization development; Sep 2009
36. *Fragile Planet* planetarium show; California Academy of Sciences/Morrison Planetarium; development of Oort Cloud visualization; Oct 2008
37. “Who Speaks for Earth?” by D. Grinspoon, *Seed Magazine*, Nov/Dec 2007; 2D graphic development
38. *Cosmic Journey (III)* planetarium show; visualization developer, science adviser, and story; Denver Museum of Nature & Science, Oct 2007

39. *Richard Pinhas, Antoine Paganotti, and Jerome Schmidt*; live flight and visualization development for multimedia performance; Gates Planetarium, DMNS, 26 Jun 2007
40. *Gaia Journeys* with Kenji Williams; live flight and visualization development for multimedia performance; Gates Planetarium, DMNS, 15–18 Feb 2007
41. *Black Holes: The Other Side of Infinity* planetarium show; visualization developer, science adviser, and story; Denver Museum of Nature & Science, Feb 2006
42. *Cosmic Journey (II)* planetarium show; visualization developer, science adviser, and story; Denver Museum of Nature & Science, Jan 2004
43. *Cosmic Journey (I)* planetarium show; visualization developer, science adviser, and story; Denver Museum of Nature & Science, Jul 2003

## Video Production

1. *A New Horizons New Year: The Ultima Thule Flyby*, March 2019; writer & director  
<https://www.youtube.com/watch?v=rz5Ss-k6UjQ>
2. *A Global Water Story*, May 2012; director, script, research & data visualization  
<https://www.youtube.com/watch?v=u3jIVxQcK6E>;  
<https://vimeo.com/41826159>;  
<https://vimeo.com/43421157>;

## Professional Talks & Presentations

1. 3 Feb 2019 “Immersive Learning in Digital Planetariums: A Review of Recent Research,” IMERSA Summit, Columbus, OH
2. 5 Jul 2018 “Teaching Distances to Stars and Galaxies with a Digital Planetarium”, International Planetarium Society talk, Toulouse, France
3. 5 Jul 2018 “Space Tours Live! Audience Choice for a Live Planetarium Show”, International Planetarium Society talk, Toulouse, France
4. 10 Jan 2018 “Characterizing the W40 Cluster Region with the UKIDSS Galactic Plane survey” poster, American Astronomical Society Meeting #231, Washington, DC
5. 8 Aug 2017 “Research-based Best Practices for Immersive Full-dome Filmmaking,” Gordon Research Conference on Visualizations in Science & Education, Bates College, Lewiston, ME
6. 21 Mar 2017 “Group Immersive Education with Digital Planetariums,” IEEE Virtual Reality 2017 Conference, Los Angeles, CA
7. 24 Aug 2016 “Immersive Storytelling and Filmmaking in Digital Domes” with Dan Neafus, Immersive Education Summit 2016, Gates Planetarium, DMNS
8. 23 Aug 2016 “Digital Earth: Colorado Macroecology in the Anthropocene” with Bob Reynolds, Immersive Education Summit 2016, Gates Planetarium, DMNS
9. 23 Jun 2016 “Conducting Research in the Planetarium,” International Planetarium Society panel workshop, Warsaw, Poland
10. 21 Jun 2016 “Full-dome Visuals for Teaching Solar System Moons”, Planetarium Effectiveness in Astronomy Education track, International Planetarium Society talk, Warsaw, Poland
11. 21 Jun 2016 “Teaching Scale with a Digital Planetarium”, Best Practices in Live Touring Through the Universe track, International Planetarium Society talk, Warsaw, Poland
12. 20 Jun 2016 “Data to Dome,” International Planetarium Society panel discussion, Warsaw, Poland
13. 31 May 2016 “Effectiveness of Immersive Visualizations in Astronomy Education,” Large Synoptic Survey Telescope, Tucson, AZ
14. 20 May 2016 “Digital Planetariums for Learning in Astronomy Education,” Communicating Astronomy with the Public, Medellín, Colombia
15. 19 Mar 2016 “Visual Immersion for Greater Learning Gains in Digital Domes,” IMERSA Summit, Denver, CO

16. 8 Dec 2015 Worldviews Network/North Central Climate Science Center/USGS Private Event, Ft. Collins Museum of Discovery, Ft. Collins, CO
17. 30 Nov 2015 North Central Climate Science Center Demonstration, Ft. Collins Museum of Discovery, Ft. Collins, CO
18. 19 Oct 2015 “The Future of Planetariums” panel, Association of Science-Technology Centers Annual Meeting, Montreal, Quebec, Canada
19. 22 Sep 2015 “Photorealistic Visuals as a Memory Aid: An Example from Moon Systems,” Uniview Users Group Meeting, California Academy of Sciences, San Francisco, CA
20. 21 Sep 2015 “Teaching Scale with a Digital Planetarium,” Uniview Users Group Meeting, California Academy of Sciences, San Francisco, CA
21. 22 May 2015 “Regional View of Climate Connections” presentation at 2015 Open Science Consortium with Dennis Ojima, Ft. Collins, CO
22. 20 Apr 2015 “Dynamic Planet Visualizations” presentation at Future Earth Forum with David McConville and Ned Gardiner, Montréal, QC
23. 20 Mar 2015 “Review of Digital Planetarium Research” IRIS Campaign Committee, Dallas, TX
24. 28 Feb 2015 “What Can Research & Astronomy Learning in Immersive Virtual Environments” in *What Can Research Teach Us?* panel, IMERSA Summit
25. 26 Feb 2015 “Entertainment and Education Case Studies” in *Real-time Content: Leveraging Datasets and Opportunities* panel, IMERSA Summit
26. 26 Feb 2015 “Tools and Capabilities for Real-time Fulldome Production” in *What is Fulldome? A Celebration of the Medium* panel with Dan Neafus and Toshiyuki Takahei, IMERSA Summit
27. 9–11 Nov 2014 “Worldviews Network: Migrations and the Cycles of Life,” Goto Airdome in ISDE Exhibition, WINC-Aichi, Nagoya, Japan
28. 9–11 Nov 2014 “Worldviews Network: Pine Beetles,” Goto Airdome in ISDE Exhibition, WINC-Aichi, Nagoya, Japan
29. 9–11 Nov 2014 “Worldviews Network: A Global Water Story,” Goto Airdome in ISDE Exhibition, WINC-Aichi, Nagoya, Japan
30. 8 Nov 2014 “Digital Planetariums for Digital Earth: Migrations and the Cycles of Life,” ISDE opening event, Nagoya City Science Museum
31. 4 Sep 2014 “Visualizing Climate Change” Boston Museum of Science Climate Change Education Symposium, Boston, MA
32. 5 Aug 2014 “Digital Planetariums and Immersive Visualizations for Learning Astronomy” Astronomical Society of the Pacific, Burlingame, CA
33. 30 Jul 2014 “Immersive Fulldome Theaters vs. Non-Immersive Displays for Astronomy Education,” Adler Planetarium, Chicago, IL
34. 12 Jul 2014 “Worldviews Network and Digital Planetariums” Synra Dome, Tokyo Science Museum, Tokyo, Japan
35. 26 Jun 2014 “Planetariums for Community Dialogues on Ecological Resilience and Global Change,” International Planetarium Society panel, Beijing, China
36. 24 Jun 2014 IPS Task Force on Science and Data Visualization, International Planetarium Society presentation, Beijing, China
37. 23 Jun 2014 “Production Pipeline for Real-time Planetarium Presentations of Global Change Topics” International Planetarium Society talk, Beijing, China
38. 23 Jun 2014 “Immersive Fulldome Theaters vs. Non-Immersive Displays for Astronomy Education,” International Planetarium Society talk, Beijing, China
39. 8 Mar 2014 “Immersive Virtual Environments for Astronomy Education” talk at IMERSA Summit
40. 6 Mar 2014 “Black Box Magic: Performance and Multimedia in the Dome” presentation at IMERSA Summit
41. 6 Mar 2014 “Harnessing the Power of Real-time Production for Planetariums and Science Centers” panel at IMERSA Summit

42. 12 Dec 2013 “Worldviews Network – Engaging Public Audiences in Global Change Dialogues,” Uniview User Group Meeting, MacMillan Space Centre, Vancouver, BC
43. 13 Dec 2013 “Immersive Virtual Environments for Astronomy Education,” Uniview User Group Meeting, Vancouver, BC
44. 13 Dec 2013 “Panel Discussion,” Uniview User Group Meeting, Vancouver, BC
45. 26 Aug 2013 “The Worldviews Network: Digital Earth for Ecological and Resilience Education,” 8th International Symposium on Digital Earth 2013, Kuching, Malaysia
46. 17 Feb 2013 “3D Reality in the Dome: A Cautionary Perspective,” IMERSA Fulldome Workshop
47. 14 Feb 2013 “Immersive Learning and Teaching in the Dome,” IMERSA Fulldome Workshop
48. 14 Feb 2013 “Worldviews Network,” IMERSA Fulldome Workshop
49. 14 Feb 2013 “Immersion Perception, and the Principles of Fulldome Filmmaking,” IMERSA Fulldome Workshop
50. 14 Feb 2013 “Panorama Stitching/HDR Processing,” IMERSA Fulldome Workshop
51. 7 Feb 2013 “Advanced Cameras Break-out Forum,” IMERSA Fulldome Workshop
52. 1 Feb 2013 “Worldviews Network *Earth, Migrations, and the Human Effect* Professional Development training,” webinar and domecast
53. 24 Jan 2013 “Worldviews Network *A Global Water Story* Professional Development training,” webinar and domecast
54. 18 Sep 2012 “User-Produced Modules from DMNS,” Uniview Users Group Meeting 2012, Böchum, Germany
55. 17 Sep 2012 “Worldviews Network: Ecological Literacy Programming for Digital Planetariums,” Uniview Users Group Meeting 2012, Böchum, Germany
56. 7 Sep 2012 “Art, Science, Sustainability,” Western Art Alliance, Denver, CO
57. 6 Sep 2012 “Guerilla Pano-Photography,” Jackson Hole Symposium, Denver, CO
58. 5 Sep 2012 “Dome Deconstructed: Real-time Data Visualizations” presentation with Bob Raynolds and Carter Emmart, Jackson Hole Symposium, Gates Planetarium, Denver, CO
59. 25 Jul 2012 “Worldviews Network Global Water Story” demonstration, International Planetarium Society meeting, Baton Rouge, LA
60. 25 Jul 2012 “Earth Sciences in the Planetarium Environment” panel, International Planetarium Society meeting, Baton Rouge, LA
61. 23 Jul 2012 “Tools and Strategies for Presenting Ecological and Earth-based Content in Live Dome Presentations” panel, International Planetarium Society meeting, Baton Rouge, LA
62. 13 Jun 2012 “Learning and Inspiration within Immersive Dome Environments,” Space Show V Science and Education Colloquium, AMNH, New York City, NY
63. 17 Apr 2012 “Worldviews Network Share-A-Thon,” NASA-NOAA-NSF CCEPI Meeting, Arlington, VA
64. 8 Mar 2012 “A Global Water Story,” for Colorado WaterWise Meeting with Bob Raynolds and Greg Mancari, Aurora, CO
65. 4 Feb 2012 “Fulldome Cinema in Practice,” IMERSA Summit, Gates Planetarium, DMNS
66. 25 Jan 2012 “A Global Water Story,” 2012 Water Congress with Bob Raynolds and Greg Mancari, DTC, Denver, CO
67. 11 Aug 2011 “Uniview for Earth Systems” presentation for Seiler Instrument/Zeiss demonstration, H.R. MacMillan Space Centre, Vancouver, BC
68. 11 Aug 2011 “Uniview for Earth Systems” presentation for planetarium staff, H.R. MacMillan Space Centre, Vancouver, BC
69. 1 Aug 2011 *Sci-Fi Film Series* Talk on *Moon*, Colfax FilmCenter, Denver, CO
70. 26 Jul 2011 “Re-Imagining Worldviews: Digital Planetariums for Ecological Literacy,” Uniview Users Group Meeting, Mayborn Planetarium, Killeen, TX

71. 25 Jul 2011 “Astroviz Hacks, Panos, and Bubble Slides: Constructing New Uniview Modules from Scratch,” Uniview Users Group Meeting, Mayborn Planetarium, Killeen, TX
72. 4 May 2011 “Worldviews Network Demonstration,” *Science On a Sphere* Users Network Meeting, Museum of Science and Industry, Chicago, IL
73. 4 May 2011 “Cross-Site Summative Evaluation of SOS Results and Commentary” panel, *Science On a Sphere* Users Network Meeting, Museum of Science and Industry, Chicago, IL
74. 16 Mar 2011 “Community Engagement” presentation for Worldviews Network Institute with Ned Gardiner, Lindsay Irving, Greg Mancari, and Bob Reynolds, DMNS
75. 16 Mar 2011 “Tech Roundtable: KML, WMS, SOS, Panos, Octopus” presentation for Worldviews Network Institute with Ned Gardiner, Lindsay Irving, and Greg Mancari, DMNS
76. 16 Mar 2011 “Constructing Narratives in Uniview: The Visualization Narrative Matrix” presentation for Worldviews Network Institute, DMNS
77. 16 Mar 2011 “Immersive Learning” presentation for Worldviews Network Institute, DMNS
78. 15 Mar 2011 “Leadership for What? Re-Imagining the Big Picture” GeoDome presentation for Leadership & Sustainability Training, with David McConville, Ned Gardiner, & Bob Reynolds, DMNS
79. 1 Mar 2011 “Visualization Technologies for Earth Systems Education in Museums” talk at NSF-NOAA-NASA Climate Change Education PI Meeting, Fairfax, VA
80. 28 Oct 2010 “The Worldviews Network,” talk and demonstration with David McConville, at Jackson Hole Symposium 2010, Gates Planetarium, DMNS
81. 28 Oct 2010 “The Potential of the Fulldome Medium: Audience Reactions and Long-term Impacts of Earth Science Lectures,” talk at Jackson Hole Symposium 2010, Gates Planetarium, DMNS
82. 4 Aug 2010 “Long-Term Audience Impacts of Live Fulldome Planetarium Earth Science Lectures,” talk at the Astronomical Society of the Pacific/Geological Society of America meeting, Boulder, CO
83. 29 Jun 2010 “Students Teaching Astronomy Using Real-time Technology (START): Results from a Teen Summer Program,” talk at the International Planetarium Society meeting, Alexandria, Egypt
84. 27 Jun 2010 “Long-Term Audience Impacts of Live Fulldome Planetarium Earth Science Lectures,” talk at the International Planetarium Society meeting, Alexandria, Egypt
85. 27 Jun 2010 “Life Out There: An Astrobiology Multimedia Experience in the Fulldome Planetarium,” talk at the International Planetarium Society meeting, Alexandria, Egypt
86. 14 Apr 2010 “Recent Uniview Projects @DMNS,” Uniview Users Meeting, Stockholm, Sweden
87. 10 Sep 2009 “Immersive Digital Earth Visualizations for Enhancing Public Understanding of Earth Resource and Climate Issues,” 6th International Symposium for Digital Earth, Beijing, China
88. 8 May 2009 “Speckify and Gallery: New Open Source Toolsets for Generating 3D Astronomical Datasets for Planetarium Visualization Software,” Astro Viz Workshop, California Academy of Sciences, San Francisco, CA
89. 18 Oct 2008 “Immersing Minds in the ISE Mission: Working Frontiers of 3-D Technology,” ASTC Panel leader, Association of Science & Technology Centers conference, Philadelphia, PA
90. 3 Jul 2008 “Future directions for research: Media aesthetics and fulldome filmmaking,” Fulldome Summit, Chicago, IL
91. 1 Jul 2008 “Fulldome Planetariums for Immersive Virtual Astronomy Education,” International Planetarium Society workshop, Adler Planetarium, Chicago, IL
92. 1 Jul 2008 “Astronomical Data Standards,” International Planetarium Society panel, Adler Planetarium, Chicago, IL
93. 1 Jul 2008 “Real Time Scaling of Real Time Data for Real Time Teaching and Learning – planetariums as immersive learning labs,” International Planetarium Society panel, Adler Planetarium, Chicago, IL
94. 27 Mar 2008 “vPresent: A New Open Source Presentation Tool for Immersive Environments,” Immersive Cinema Workshop, Plymouth, UK



95. 26 Mar 2008 “Media Aesthetics for Fulldome Filmmaking (II),” Immersive Cinema Workshop, Plymouth, UK
96. 29–30 Oct 2007 “Geospatial Data Presentations in Planetariums” demonstration for Geological Society of America conference attendees, Gates Planetarium, DMNS
97. 10 Oct 2007 “Gates Planetarium: At the Four Year Mark and Beyond,” Hamburg Planetarium, Hamburg, Germany
98. 3 Oct 2007 “Visuospatial Astronomy Education in Immersive Digital Planetariums,” Communicating Astronomy with the Public 2007, Athens, Greece
99. 5–7 Sep 2007 “Astronomy Learning in Immersive Virtual Environments,” 119th Astronomical Society of the Pacific, Chicago, IL
100. 4 Sep 2007 “Beyond Lasers: Scientific Visualizations for Multimedia Art Experiences in Digital Planetaria,” Astronomy Visualization Workshop 2007, Chicago, IL
101. 21 Jul 2007 “Media Aesthetics for Fulldome Filmmaking,” Domefest 2007, Albuquerque, NM
102. 4 Jul 2007 “Astronomy Learning in Immersive Virtual Environments,” Gordon Research Conference on Scientific Visualization for Education, Bryant University, RI
103. 5–9 Jun 2007 “Gaia Journeys: A Museum-based Immersive Performance Exploration of Earth,” 5th International Symposium on Digital Earth, Berkeley, CA
104. 7–8 Dec 2006 “The ALIVE Project: Astronomy Learning in Immersive Virtual Environments” poster, NSF REESE Principal Investigators Meeting, Washington, DC
105. 8 Nov 2006 “Procedural Noise Techniques for Astronomical Renderings,” Astro-Viz ’06, Pasadena, CA
106. 8 Nov 2006 “Planetarium Production Stories: Live Action Film Footage for a Fulldome Show,” Astro-Viz ’06, Pasadena, CA
107. 29 Oct 2006 “Evaluating Astronomy Learning in Immersive Virtual Environments” talk in the panel “Understanding the Audience Potential of Fulldome Digital Video,” Association of Science & Technology Centers, Louisville, KY
108. 17 Sep 2006 *Black Holes: The Other Side of Infinity* fulldome clip introduction, 118th Astronomical Society of the Pacific, Baltimore
109. 8 Sep 2005 Western Alliance Conference of Planetariums, DMNS
110. 26 May 2005 “A Real-Time Milky Way Galaxy Simulation” talk at Visualization of Astrophysical Data conference, Kavli Institute for Cosmological Physics, University of Chicago, Chicago, IL
111. 14 Apr 2005 Lockheed Martin Solar Physics group, Sunnyvale, CA
112. 14 Apr 2005 SOFIA science & engineering team, NASA Ames, CA
113. Aug 2001 NASA Ames, Moffett Field, CA
114. Aug 2001 JPL, Pasadena, CA
115. Aug 2001 UCLA, Los Angeles, CA
116. Jan 2001 AAS Meeting #197, San Diego, CA
117. May 2000 NRAO, Socorro, NM
118. Nov 1999 CfA, Cambridge, MA
119. Apr 1999 Caltech, Pasadena, CA
120. Mar 1999 NOAO, Tucson, AZ

## Media Appearances

1. 17 Jan 2019 “Super Blood Red Moon”, 9NEWS, Denver, CO
2. 17 Jan 2019 “Super Blood Wolf Moon Lunar Eclipse”, Denver 7, Denver, CO
3. 26 Nov 2018 Radio interview about Insight Mission, Chuck & Julie Show, KNUS 710 AM, Denver, CO
4. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 23 ABC KERO, Bakersfield, CA

5. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 2 WMAR, Baltimore, MD
6. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 6 KIVI (ABC), Boise, ID
7. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, J105 KJOT, Boise, ID
8. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 7 WKBW (ABC), Buffalo, NY
9. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 9 WCPO (ABC), Cincinnati, OH
10. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, News 5 WEWS (ABC), Cleveland, OH
11. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, Denver 7 (ABC), Denver, CO
12. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 7 WXYZ (ABC), Detroit, MI
13. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, Fox 4 WFTX, Fort Myers/Naples, FL
14. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 26 WGBA (NBC), Green Bay, WI
15. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, RTV6 WRTV (ABC), Indianapolis, IN
16. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 41 KSHB (NBC), Kansas City, MO
17. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, Fox 47, Lansing, MI
18. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 13 KTNV (ABC), Las Vegas, NV
19. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 620 AM/103.3 FM WTMJ, Milwaukee, WI
20. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 3 KMTV (CBS), Omaha, NE
21. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 106.3 The Groove KTGTV, Oracle, AZ
22. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, ABC 15 KNXV, Phoenix, AZ
23. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 10 News KGTV (ABC), San Diego, CA
24. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, WFTS (ABC), Tampa Bay, FL
25. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 104.1 KQTH, Tucson, AZ
26. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 2 KJRH (NBC), Tulsa, OK
27. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, Fox 29 WFLX, West Palm Beach, FL
28. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, 5 WPTV (NBC), West Palm Beach, FL
29. 16 Nov 2018 “Hundreds of ‘flat Earth’ believers gather at Denver conference”, NewsBeezer
30. 10 Aug 2018 “Perseid Meteor Shower”, 9NEWS, Denver, CO
31. 10 Aug 2018 “Mindbender Mansion” segment on *Mile High Living*, Denver 7, Denver, CO
32. 30 May 2018 “Is ‘Manhattanhenge’ possible in Denver?”, 9NEWS, Denver, CO

33. 31 Jan 2018 “Super Blue Blood Moon”, CBS 4, Denver, CO
34. 31 Jan 2018 “Super Blue Blood Moon”, Denver 7, Denver, CO
35. 31 Jan 2018 “Super Blue Blood Moon”, 9NEWS, Denver, CO
36. 31 Jan 2018 “Super Blue Blood Moon”, Fox 31/Channel 2 News, Denver, CO
37. 19 Oct 2017 “Cosmic Crash Connects Man Closer to the Cosmos”, 9NEWS, Denver, CO
38. 17 Oct 2017 “Colliding Neutron Stars”, Fox31, Denver, CO
39. 17 Oct 2017 “Colliding Neutron Stars”, Channel 2 News, Denver, CO
40. 17 Aug 2017 “Total Solar Eclipse”, Fox 31, Denver, CO
41. 16 Aug 2017 “Total Solar Eclipse,” 9NEWS, Denver, CO
42. 24 Feb 2017 Radio interview about TRAPPIST-1, KNUS 710 AM, Denver, CO
43. 8 Feb 2017 “You can see an eclipse, a comet, and a full moon Friday night,” 9News, Denver, CO
44. 14 Nov 2016 “Super Moon,” 9News, Denver, CO
45. 10 Feb 2016 “Hundreds of galaxies hiding behind the Milky Way”, 9News, Denver, CO
46. 6 Jan 2016 “Stunning Images: When Galaxies Collide”, Fox 31, Denver, CO
47. 31 Oct 2015 “Halloween asteroid “Spooky” lives up to name”, 9News, Denver, CO
48. 30 Oct 2015 “Fireballs may be visible in the sky on Halloween night”, 9 News, Denver, CO
49. 28 Sep 2015 “Harvest Moon eclipse Sunday night”, 9News, Denver, CO
50. 27 Sep 2015 “Super Moon,” Fox 31, Denver, CO
51. 25 Sep 2015 “Rare Harvest Moon Lunar Eclipse is Sunday”, 9News, Denver, CO
52. 2 Jul 2015 “Earth Visualization at Aspen Ideas Festival”, KDNK Community Radio, Carbon-dale/Glenwood, CO
53. 20 Mar 2015 “Spring, Solar Eclipse, and Super Moon”, The Now, Channel 28, WFTS, Tampa Bay, FL
54. 20 Mar 2015 “Spring, Solar Eclipse, and Super Moon”, The Now, Channel 9, WCPO, Cincinnati, OH
55. 20 Mar 2015 “Spring, Solar Eclipse, and Super Moon”, The Now, Channel 41, KSHB, Kansas City, MO
56. 20 Mar 2015 “Spring, Solar Eclipse, and Super Moon”, The Now, Channel 9, KMGH, Denver, CO
57. 7 Jan 2015 “8 potential Earth-like planets discovered”, 9News, Denver, CO
58. 24 Aug 2014 “McConnell programs let participants experience the world in a new way”, *The Daily Sentinel*, Grand Junction, CO
59. 24 Aug 2014 “Space fan leads tour that’s out of this world”, *The Daily Sentinel*, Grand Junction, CO
60. 12 Sep 2014 “Solar flare and coronal mass ejection” TV interview, *The Now*, Channel 7, Denver, CO
61. 18 Jul 2014 #57 Ka Chun Yu on using Immersive Domes to create compelling & effective visualizations for education & group discussions on ecological issues, *Voices of VR podcast*
62. 9 May 2014 Kepler Spacecraft discovery TV interview, Fox 31, Denver, CO
63. 15 Apr 2014 “‘Blood Moon’ will be easy to see,” TV interview, 9News, Denver, CO
64. 28 Jun 2013 “Africa’s energy poverty, as seen from space,” David Wogan blog, *Scientific American*
65. 27 Jun 2013 “India and Pakistan’s Relationship According to Space,” Megan Garber blog, *The Atlantic*
66. 18 Apr 2013 “Kepler-62 and Kepler-69” TV interview, Fox 31 News, Denver, CO
67. 14 Feb 2013 “150-foot asteroid will buzz Earth Friday” TV interview, 9 News Morning News, Denver, CO

68. 5 Aug 2010 “Planetariums and IMAX Shows” interview with Tammy Kranz, in *Westminster Window*, p. 7A, and *Northglenn-Thornton Sentinel*, p. 3B
69. 15 Jul 2010 *Journey to the Stars*, radio interview, KUVU, Denver, CO
70. 18 Mar 2010 *Hubble IMAX* interview, 9News noon newscast, Denver, CO
71. 19 Jan 2006 K. Powell, “Dream big,” *Nature*, **439**, pp. 364–365
72. 8 Aug 2005 “Shuttle Discovery landing” TV interview, Channel 2 News, Denver, CO
73. 22 Jun 2005 “Full moon illusion on the summer solstice,” radio interview, KOA, Denver, CO
74. 10 May 2005 TV appearance, “Colorado and Company,” 9News, Denver, CO

## Miscellaneous Program Development

1. May 2019 Science Lounge: Moon Mayhem, DMNS
2. Nov 2018 Insight Landing, DMNS
3. Sep 2018 Science Lounge: Asteroids, DMNS
4. Feb 2018 Science Lounge: Mars, DMNS
5. May 2017 Discovery Outpost School Experience: Interstellar Travel & Invisible World , DMNS
6. May 2017 Science Lounge: Space Oddity, DMNS
7. Feb 2017 Science Lounge: Time Travel, DMNS
8. Oct 2016 Science Lounge: Space Society, DMNS
9. Jun 2016 Science Lounge: Pluto Party, DMNS
10. Feb 2015 Science Lounge: Rocket Science, DMNS
11. Oct 2014 Science Lounge Ideas, DMNS
12. Jun 2014 Science Lounge: Exoplanets and Aliens, DMNS
13. Feb 2014 Science Lounge: Archaeoastronomy, DMNS
14. Jan 2014 Science Lounge: Space Camp, DMNS
15. Dec 2013 Science Lounge: End of the World, DMNS
16. Jun 2013 Science Lounge: Particle Party, DMNS
17. Feb 2013 Science Lounge: Venus, DMNS
18. Aug 2012 Science Lounge Ideas, DMNS
19. Jul 2012 Science Lounge: Big Bang, DMNS
20. Sep 2011 Science Lounge: Bubbles, DMNS
21. Jun 2011 Science Lounge: Halloween, DMNS
22. Mar 2011 Science Lounge: Science and Art, DMNS
23. Jan 2011 Science Lounge, DMNS
24. Oct 2011 Science Lounge, DMNS
25. Dec 2010 *Prehistoric Journey* Early Earth animation, DMNS
26. Jun 2010 Science Lounge, DMNS
27. Aug 2009 My Night Sky, DMNS

## Worldviews Network Training Videos

1. 12 Jun 2014 “KML Creation: Image Overlays”
2. 10 Jun 2014 “KML Creation: Paths”
3. 12 Jun 2014 “KML Creation: Placemarkers”

4. 10 Jun 2014 “KML Creation: Polygons”
5. 4 Jun 2014 “Producing 2D Slides for Uniview”
6. 12 Jun 2014 “Prodcing Fisheyes for Uniview”
7. 3 Jun 2014 “Producing Panoramas for Uniview”
8. 12 Jun 2014 “Geospatial Data Websites: Ka Chun’s Favorites”
9. 16 May 2014 “Forests, Beetles, and Cycles of Life”
10. 18 Apr 2014 “A Global Water Story”

## Teacher Professional Development

1. 8 Jun 2019 “Introduction to Global Climate Change Summer Field Course” Teachers Professional Development workshop, Gates Planetarium, DMNS
2. 10 Jun 2017 “A Global Water Story” Teachers Professional Development workshop, Gates Planetarium, DMNS
3. 25 Apr 2017 Planetarium Star Talk for Pre-service Teacher Professional Development, Gates Planetarium, DMNS
4. 15 Oct 2016 “A Global Water Story” Teachers Professional Development workshop with Bob Reynolds, Gates Planetarium, DMNS
5. 19 Sep 2015 “Space Science Professional Development” for Cherry Creek School District 8th grade teachers, Gates Planetarium, DMNS
6. 18 Jun 2014 Inquiry Academy Teacher Professional Development workshop, DMNS
7. 2 Nov 2013 “A Global Water Story,” *Science On a Sphere* Teachers Professional Development workshop, Gates Planetarium, DMNS
8. 10 Jul 2012 “Light Inquiry” Teacher Professional Development workshop, DMNS
9. 2 Jun 2010 “Science Standards and Misconceptions in Astronomy Education” presentation for Simply Science Teachers Workshop, DMNS
10. 20 Feb 2010 “Misconceptions in Astronomy Education,” Teachers Professional Development workshop, DMNS
11. 9 Dec 2008 “Physics of Light and Color” Teachers Workshop, DMNS
12. 13 Jun 2008 “Virtual Astronomy from the Ground Up,” talk for Dine teachers, Ricketson Auditorium, DMNS
13. 3 Jun 2006 “What Do I Do As a Scientist?” talk for Project Curiosity Teacher’s Workshop, DMNS
14. 4 Mar 2006 “The Astrophysics of *Black Holes: The Other Side of Infinity*” talk for “It’s All Relative” Teacher’s Workshop, DMNS
15. 25 Oct 2005 “The History and Fate of the Universe” talk to Discover Plasma Science Teachers Day professional development workshop, Denver, CO
16. 13 Aug 2005 “Star Formation: From Gas Clouds to Planets” talk to Solar Physics and Space Weather Teachers Professional Development workshop, DMNS
17. 9 Jun 2005 “From Gas Clouds to Planets” talk to Ft. Collins Discovery Center teachers, DMNS
18. 6 Jun 2005 Constellation talk to DMNS Outreach teachers
19. 23 Nov 2004 Talk to Science Matters Teachers Professional Development workshop, Littleton, CO
20. Aug 2004 “Star Formation: From Clouds to Planets” talk to Astrobiology: Life in Space Teachers Professional Development workshop, DMNS

## Volunteer Training

1. 29 Jan 2019 Museum Galaxy Guide Volunteer Training for Uniview, DMNS
2. 22 Feb 2018 Museum Galaxy Guide Volunteer Training for Spectroscopy Cart, DMNS

3. 5 Sep 2017 Museum Galaxy Guide Volunteer Training for Uniview, DMNS
4. 29 Apr 2016 Museum Galaxy Guide Volunteer Training for Solar Wind, DMNS
5. 31 Mar 2016 Uniview Digital Earth Training for Museum Programs staff, Gates Planetarium, DMNS
6. 15 Mar 2016 Orbits Table/Space Odyssey Training for New Museum Galaxy Guide Volunteers, DMNS
7. 4 Mar 2016 Orbits Table Training for Museum Galaxy Guide Volunteers, DMNS
8. 20 Jul 2015 “Alternate and “Mis”-Conceptions in Astronomy and Science Education” Training for Museum Galaxy Guide Volunteers, DMNS
9. 9 Feb 2015 Gravity Well, Spectroscopy, and Infrared Table Training for Museum Galaxy Guide Volunteers, DMNS
10. 9 Apr 2014 Gravity Well Training for Museum Galaxy Guide Volunteers, DMNS
11. 8 Apr 2014 Uniview Training for Planetarium Volunteers, Gates Planetarium, DMNS
12. 3 Apr 2014 Museum Galaxy Guide Training, DMNS
13. 2 Apr 2014 Museum Galaxy Guide Training, DMNS
14. 9 Oct 2013 *Mythbusters* Volunteer Training, DMNS
15. 2 Oct 2013 *Mythbusters* Volunteer Training, DMNS
16. 25 Sep 2013 *Mythbusters* Volunteer Training, DMNS
17. 5 Aug 2011 Museum Galaxy Guide Briefing, Space Odyssey Volunteer Training, DMNS
18. 14 Sep 2010 Museum Galaxy Guide Briefing, Space Odyssey Volunteer Training, DMNS
19. 12 Mar 2010 Spectroscopic Parallax Training for Museum Galaxy Guide Volunteers, DMNS
20. 8 Mar 2010 GLIMPSE Survey Spitzer Kiosk Training for Museum Galaxy Guide Volunteers, DMNS
21. 26 Feb 2009 Milankovitch Cycle Training for Museum Galaxy Guide Volunteers, DMNS
22. 25–26 Sep 29, 2008 Spectroscopy Training for Museum Galaxy Guide Volunteers, DMNS
23. 21–22 Sep 2008 Spectroscopy Training for Museum Galaxy Guide Volunteers, DMNS
24. 16 Jun 2008 *Hubble Space Telescope Discovery Workshop V: Data Reduction and Color Image Compositing*, Training for Museum Galaxy Guide Volunteers, DMNS
25. 19 May 2008 *Hubble Space Telescope Discovery Workshop IV: Hubble Key Project*, Training for Museum Galaxy Guide Volunteers, DMNS
26. 12 May 2008 *Hubble Space Telescope Discovery Workshop III: V838 Mon and SN 1987A*, Training for Museum Galaxy Guide Volunteers, DMNS
27. 5 May 2008 *Hubble Space Telescope Discovery Workshop II: Proplyds and Star Formation in Orion*, Training for Museum Galaxy Guide Volunteers, DMNS
28. 14 Apr 2008 *Hubble Space Telescope Discovery Workshop I: Introduction*, Training for Museum Galaxy Guide Volunteers, DMNS
29. 5 Mar 2008 Spectroscopy Training for Museum Galaxy Guide Volunteers, DMNS
30. 12–18 Dec 2006 Museum Galaxy Guide Briefings, Space Odyssey Volunteer Training, DMNS
31. 9–12 Dec 2004 Museum Galaxy Guide Briefings, Space Odyssey Volunteer Training, DMNS

## Public Talks, Tours, & Interviews

1. 2 Jun 2018 “Black Panther: The Science of Wakanda,” with EllaMaria Ray and Charles Musiba, Denver Pop Culture Con, Denver, CO

2. 24 Apr 2019 “60 Minutes in Space” monthly presentation, DMNS
3. 23 Apr 2019 “Digital Earth: Italy” with Bob Raynolds, Gates Planetarium, DMNS
4. 7 Mar 2019 “Digital Earth: Beer” with Travis Rupp, Gates Planetarium, DMNS
5. 27 Feb 2019 “60 Minutes in Space” monthly presentation, DMNS
6. 31 Jan 2019 “Gateway to the Infinite” talk with Michele Koons, in conjunction with Museo de las Americas, Gates Planetarium, DMNS
7. 30 Jan 2019 “60 Minutes in Space” monthly presentation, DMNS
8. 23–24 Jan, 2019 “Tour of the Universe,” DMNS Scientists in Action distance learning classes
9. 22 Jan 2019 “Colors of Space” talk in conjunction with Museo de las Americas, IMAX Theater, DMNS
10. 10 Dec 2018 “Digital Earth: Cuba” with Kaifa Roland, Gates Planetarium, DMNS
11. 28 Nov 2018 “Black Panther: The Science of Wakanda,” with EllaMaria Ray and Charles Musiba, IMAX Theater, DMNS
12. 1 Nov 2018 “Digital Mars,” with Steve Lee, Gates Planetarium, DMNS
13. 29 Oct 2018 “Digital Earth Pop-Up” with Bob Raynolds, Space Odyssey, DMNS
14. 24 Oct 2018 “Geography of People” class with Bob Raynolds, Gates Planetarium, DMNS
15. 18 Oct 2018 “Digital Earth Pop-Up” with Bob Raynolds, Space Odyssey, DMNS
16. 16 Oct 2018 “Geography of People” class with Bob Raynolds, Gates Planetarium, DMNS
17. 5 Oct 2018 “Challenges of Deep Space Exploration” talk for First LEGO League, DMNS
18. 2 Oct 2018 “Earth-Sun Connection” talk with Mark Miesch, Gates Planetarium, DMNS
19. 1 Oct 2018 “Our Active Sun” DMNS
20. 28 Sep 2018 “Our Active Sun” DMNS
21. 30 Aug 2018 “The Last Question” Planetarium show Q&A, Gates Planetarium, DMNS
22. 29 Aug 2018 “60 Minutes in Space” monthly presentation, DMNS
23. 28 Aug 2018 OpenSpace support for *Chasing New Horizons* booksigning with David Grinspoon and Alan Stern, Gates Planetarium, DMNS
24. 15 Aug 2018 *Sci-Fi Film Series* discussion for *Blade Runner 2049* with Vincent Pinturro, Sie Film-Center, Denver, CO
25. 13 Aug 2018 “Science On the Spot: All Fired Up,” DMNS
26. 9 Aug 2018 “Digital Earth: Wine” with Bob Raynolds, Gates Planetarium, DMNS
27. 25 Jul 2018 “60 Minutes in Space” monthly presentation, DMNS
28. 31 May 2018 “Digital Earth: Turkana Basin” with Bob Raynolds, Gates Planetarium, DMNS
29. 30 May 2018 “60 Minutes in Space” monthly presentation, DMNS
30. 25 Apr 2018 “60 Minutes in Space” monthly presentation, DMNS
31. 24 Apr 2018 “The Man from 9 Dimensions” Planetarium show Q&A, Gates Planetarium, DMNS
32. 19 Apr 2018 “Updates on Our Universe: Its History and Fate, Gravitational Waves, and the Search for Exoplanets,” Utah Field House of Natural History, Vernal, UT
33. 6 Apr 2018 “Tour of the Universe,” James H. Larue Douglas County Library, Highlands Ranch, CO
34. 5 Apr 2018 “Digital Earth: Dead Sea” with Bob Raynolds, Gates Planetarium, DMNS
35. 28 Feb 2018 “60 Minutes in Space” monthly presentation, DMNS
36. 23 Feb 2018 “The Last Question” Planetarium show Q&A, Gates Planetarium, DMNS
37. 23 Feb 2018 “Investigating the Teaching of Seasons in a Full-dome Theater” presentation for the Pacific Planetarium Association Seminar

38. 31 Jan 2018 “60 Minutes in Space” monthly presentation, DMNS
39. 25 Jan 2018 “Digital Earth: Pompeii and Roman Aqueducts” with Wayne Lorenz, Ft. Collins Museum of Discovery, Ft. Collins, CO
40. 24–25 Jan, 2018 “Tour of the Universe,” DMNS Scientists in Action distance learning classes, 1161 attendees
41. 6 Dec 2017 Visualization support for “The Geography of People” class with Bob Raynolds, Gates Planetarium, DMNS
42. 29 Nov 2017 “60 Minutes in Space” monthly presentation, DMNS
43. 28 Nov 2017 “Digital Earth: Caribbean” with Bob Raynolds, Gates Planetarium, DMNS
44. 3 Nov 2017 “The Last Question” Planetarium show Q&A, Gates Planetarium, DMNS
45. 2 Nov 2017 “Exoplanets” talk for *3 Things, Any 3 Things*, Museum of Contemporary Art, Denver, CO
46. 28 Oct 2017 “Tech Yesterday, Tech Tomorrow” panel at MileHi Con, Denver, CO
47. 28 Oct 2017 “*Close Encounters & (First) Contact: Do They Hold Up?*” roundtable at MileHi Con, Denver, CO
48. 28 Oct 2017 “Societies of the Future” panel at MileHi Con, Denver, CO
49. 25 Oct 2017 “60 Minutes in Space” monthly presentation, DMNS
50. 10 Oct 2017 “Digital Earth: Cities” with Bob Raynolds, Gates Planetarium, DMNS
51. 08 Oct 2017 “My Conversation with Ka Chun Yu,” interview on *The Space Shot* podcast with John Mulnix, Episode 147
52. 13 Sep 2017 New Members Night Orbits Table, DMNS
53. 30 Aug 2017 “60 Minutes in Space” monthly presentation, DMNS
54. 21 Aug 2017 DMNS Total Solar Eclipse Tour, Wyoming
55. 17 Aug 2017 “Eclipse Chasers: Total Eclipse Science” talk for “Science Lounge: Solar Eclipses,” DMNS
56. 2 Aug 2017 *Sci-Fi Film Series* discussion for *Arrival*, Phipps IMAX Theater, DMNS, Denver, CO
57. 31 May 2017 “60 Minutes in Space” monthly presentation, DMNS
58. 10 May 2017 “Digital Earth: Iceland and Greenland” with Bob Raynolds, Gates Planetarium, DMNS
59. 2 May 2017 Visualization support for “The Geography of People” class with Bob Raynolds, Gates Planetarium, DMNS
60. 27 Apr 2017 Visualization support for “Avian Biodiversity Today” talk by Garth Spellman, Ft. Collins Museum of Discovery, Ft. Collins, CO
61. 26 Apr 2017 “60 Minutes in Space” monthly presentation, DMNS
62. 13 Apr 2017 “Digital Earth: Pompeii and Roman Aqueducts” with Wayne Lorenz, Gates Planetarium, DMNS
63. 8 Apr 2017 “Multiverse” Talkback for *Constellations* play, Curious Theater
64. 24 Mar 2017 “The Last Question” Planetarium show Q&A, Gates Planetarium, DMNS
65. 16 Mar 2017 “The Science of Time Travel” talk for “Science Lounge: Time Travel,” DMNS
66. 28 Feb 2017 “Digital Earth: National Parks” with Bob Raynolds, Gates Planetarium, DMNS
67. 15–16 Feb, 2017 “Tour of the Universe,” DMNS Scientists in Action distance learning classes, 1576 attendees
68. 30 Jan 2017 “Careers in Physics” for Beyond Boulder panel
69. 25 Jan 2017 “60 Minutes in Space” monthly presentation, DMNS
70. 13 Dec 2016 Visualization support for *Earth in Human Hands* presentation with David Grinspoon, DMNS



71. 30 Nov 2016 “60 Minutes in Space” monthly presentation, DMNS
72. 17 Nov 2016 “Death by Space: *The Martian* Edition” talk for “Science Lounge: Space Society,” DMNS
73. 15 Nov 2016 Visualization support for “Avian Biodiversity Today” talk by Garth Spellman for “Fall Bird Series,” DMNS
74. 12 Nov 2016 “LGBT-rexes Unite!: Museums and Informal Science Education as Community Catalysts,” workshop at oSTEM National Conference, Denver, CO
75. 3 Nov 2016 Landscape Biodiversity Education Using Full-dome Visualizations for Department of Interior Stakeholders presentation with Healy Hamilton, Denver, CO
76. 30 Oct 2016 “Marching Morons: Are Americans Becoming More Scientifically Illiterate?” panel at MileHi Con, Denver, CO
77. 30 Oct 2016 “Are We Living In a Simulation?” panel at MileHi Con, Denver, CO
78. 5 Oct 2016 New Members Night “Tours of the Universe,” DMNS
79. 31 Aug 2016 “60 Minutes in Space” monthly presentation, DMNS
80. 25 Aug 2016 “Digital Earth: Macchu Picchu” with Ken Wright, Gates Planetarium, DMNS
81. 10 Aug 2015 *Sci-Fi Film Series* discussion for *The Matrix*, Phipps IMAX Theater, DMNS, Denver, CO
82. 26 Jul 2016 “60 Minutes in Space” monthly presentation, DMNS
83. 1 Jul 2016 “A Macroecological Tour of Colorado,” with Bob Reynolds Aspen Ideas Festival, Aspen, CO
84. 1 Jul 2016 “Interactive Tour of the Universe,” Aspen Ideas Festival, Aspen, CO
85. 1 Jul 2016 “Live Galaxy Trek,” Aspen Ideas Festival, Aspen, CO
86. 30 Jun 2016 “Interactive Tour of the Universe,” Aspen Ideas Festival, Aspen, CO
87. 28 Jun 2016 “Live Galaxy Trek,” Aspen Ideas Festival, Aspen, CO
88. 27 Jun 2016 “Live Solar System Cruise and Telescope Gazing,” Aspen Ideas Festival, Aspen, CO
89. 27 Jun 2016 “Live Solar System Cruise I,” Aspen Ideas Festival, Aspen, CO
90. 26 Jun 2016 “Interactive Tour of the Universe II,” Aspen Ideas Festival, Aspen, CO
91. 26 Jun 2016 “Interactive Tour of the Universe I,” Aspen Ideas Festival, Aspen, CO
92. 1 Jun 2016 “Digital Earth: Petra” with Will Reynolds, Gates Planetarium, DMNS
93. 25 May 2016 “60 Minutes in Space” monthly presentation, DMNS
94. 12 May 2016 “Digital Earth: Islands” with Bob Reynolds, Ft. Collins Museum of Discovery, Ft. Collins, CO
95. 10 May 2016 Skywatchers: Calendars & Geology via Real and Virtual World Tours, KT Challenge Revealed talk, DMNS
96. 29 Apr 2016 DJ Spooky Post Performance Interview and Talk, DMNS
97. 27 Apr 2016 “60 Minutes in Space” monthly presentation, DMNS
98. 30 Mar 2016 “60 Minutes in Space” monthly presentation, DMNS
99. 27 Feb 2016 Panel Q&A with astronaut Bruce McCandless II after *Last Man on the Moon* screening, Sie FilmCenter, Denver, CO
100. 26 Feb 2016 “Tour of the Universe,” DMNS Scientists in Action distance learning class, 208 attendees
101. 26 Feb 2016 “Tour of the Universe,” DMNS Scientists in Action distance learning class, 65 attendees
102. 25 Feb 2016 “Tour of the Universe,” DMNS Scientists in Action distance learning class, 193 attendees
103. 25 Feb 2016 “Tour of the Universe,” DMNS Scientists in Action distance learning class, 305 attendees

104. 25 Feb 2016 “Tour of the Universe,” DMNS Scientists in Action distance learning class, 311 attendees
105. 25 Feb 2016 “Tour of the Universe,” DMNS Scientists in Action distance learning class, 474 attendees
106. 15 Feb 2016 “Careers in Informal Science Education” for Beyond Boulder panel
107. 12 Feb 2016 “Tour of the Universe” for Heritage Scouts, Gates Planetarium, DMNS
108. 4 Feb 2016 “Digital Earth: Islands” with Bob Reynolds, Gates Planetarium, DMNS
109. 1 Feb 2016 “Scientists in Action: Ka Chun Yu” video
110. 25 Jan 2016 Digital Earth demonstration for Trust for Public Land, Gates Planetarium, DMNS
111. 14 Jan 2016 “Tour of the Universe” for Cub Scout Pack 414 meeting, Space Odyssey, DMNS
112. 10 Dec 2015 “Digital Earth: Dark Skies” with Vanessa Mazal, Ft. Collins Museum of Discovery, Ft. Collins, CO
113. 5 Nov 2015 New Members Night “Tours of the Universe,” DMNS
114. 28 Oct 2015 “60 Minutes in Space” monthly presentation, DMNS
115. 6 Oct 2015 “Digital Earth: Dark Skies” event for National Parks Conservation Association VIP event, with Vanessa Mazal, Gates Planetarium, DMNS
116. 30 Sep 2015 “60 Minutes in Space” monthly presentation; stories I and II, DMNS
117. 29 Sep 2015 “Digital Earth: Dark Skies,” with Vanessa Mazal, Gates Planetarium, DMNS
118. 26 Aug 2015 “60 Minutes in Space” monthly presentation; stories I and II, DMNS
119. 20 Aug 2015 “Tour of the Universe” for Cosmic Cruisin’, Gates Planetarium, DMNS
120. 19 Aug 2015 “Tour of the Universe” for Cosmic Cruisin’, Gates Planetarium, DMNS
121. 5 Aug 2015 *Sci-Fi Film Series* discussion for *Blade Runner*, Phipps IMAX Theater, DMNS, Denver, CO
122. 29 Jul 2015 “60 Minutes in Space” monthly presentation, DMNS
123. 16 Jul 2015 “Pluto: A History in Images” talk for “Science Lounge: Pluto Party,” DMNS
124. 4 Jul 2015 “The Anthropocene,” with Bob Reynolds, Aspen Ideas Festival, Aspen, CO
125. 3 Jul 2015 “See the Seas,” with Bob Reynolds, Aspen Ideas Festival, Aspen, CO
126. 3 Jul 2015 “The Age of Humans,” with Bob Reynolds, Aspen Ideas Festival, Aspen, CO
127. 3 Jul 2015 “Ocean Immersion: Underwater Imagery by the XL Catlin Seaview Survey,” with Ned Gardiner and Bob Reynolds, Aspen Ideas Festival, Aspen, CO
128. 3 Jul 2015 “Ocean Immersion: Underwater Imagery by the XL Catlin Seaview Survey,” with Ned Gardiner and Bob Reynolds, Aspen Ideas Festival, Aspen, CO
129. 3 Jul 2015 “Ocean Immersion: Underwater Imagery by the XL Catlin Seaview Survey,” with Ned Gardiner and Bob Reynolds, Aspen Ideas Festival, Aspen, CO
130. 2 Jul 2015 “Interactive Tour of the Observable Universe,” Aspen Ideas Festival, Aspen, CO
131. 2 Jul 2015 “Building Resilience,” with Ned Gardiner, Aspen Ideas Festival, Aspen, CO
132. 2 Jul 2015 “The Age of Humans,” with Ned Gardiner, Aspen Ideas Festival, Aspen, CO
133. 2 Jul 2015 “Ocean Immersion: Underwater Imagery by the XL Catlin Seaview Survey,” with Ned Gardiner and Bob Reynolds, Aspen Ideas Festival, Aspen, CO
134. 2 Jul 2015 “The Age of Humans,” with Bob Reynolds, Aspen Ideas Festival, Aspen, CO
135. 1 Jul 2015 “Building Resilience,” with Ned Gardiner, Aspen Ideas Festival, Aspen, CO
136. 1 Jul 2015 “See the Seas,” with Ned Gardiner, Aspen Ideas Festival, Aspen, CO
137. 30 Jun 2015 “See the Seas,” with Bob Reynolds, Aspen Ideas Festival, Aspen, CO
138. 30 Jun 2015 “Ocean Immersion: Underwater Imagery by the XL Catlin Seaview Survey,” with Ned Gardiner and Bob Reynolds, Aspen Ideas Festival, Aspen, CO

139. 30 Jun 2015 “Building Resilience,” with Ned Gardiner, Aspen Ideas Festival, Aspen, CO
140. 30 Jun 2015 “The Age of Humans,” with Ned Gardiner, Aspen Ideas Festival, Aspen, CO
141. 30 Jun 2015 “Ocean Immersion: Underwater Imagery by the XL Catlin Seaview Survey,” with Ned Gardiner and Bob Raynolds, Aspen Ideas Festival, Aspen, CO
142. 29 Jun 2015 “Interactive Tour of the Observable Universe,” Aspen Ideas Festival, Aspen, CO
143. 29 Jun 2015 “The Age of Humans,” with Bob Raynolds, Aspen Ideas Festival, Aspen, CO
144. 29 Jun 2015 “Ocean Immersion: Underwater Imagery by the XL Catlin Seaview Survey,” with Ned Gardiner and Bob Raynolds, Aspen Ideas Festival, Aspen, CO
145. 29 Jun 2015 “See the Seas,” with Bob Raynolds, Aspen Ideas Festival, Aspen, CO
146. 29 Jun 2015 “Ocean Immersion: Underwater Imagery by the XL Catlin Seaview Survey,” with Ned Gardiner and Bob Raynolds, Aspen Ideas Festival, Aspen, CO
147. 28 Jun 2015 “Building Resilience,” with Ned Gardiner, Aspen Ideas Festival, Aspen, CO
148. 11 Jun 2015 DMNS Open House “Tours of the Universe,” DMNS
149. 27 May 2015 “60 Minutes in Space” monthly presentation; stories I, II, and III, DMNS
150. 9 May 2015 “Urban Advantage Science Celebration Uniview Demonstrations,” DMNS
151. 5 May 2015 “Digital Earth: Petra,” with Will Raynolds, Gates Planetarium, DMNS
152. 29 Apr 2015 “60 Minutes in Space” monthly presentation; stories I and II, DMNS
153. 7 Apr 2015 “Digital Earth: Silk Road for Volunteer Enrichment Committee,” with Bob Raynolds, Gates Planetarium, DMNS
154. 15 Feb 2015 “Cosmic Evolution of the Universe and (Most) Everything In It,” talk at Messiah Community Church
155. 3 Feb 2015 *Living Planet, Part III* Class with Bob Raynolds, DMNS
156. 27 Jan 2015 *Living Planet, Part II* Class with Bob Raynolds, DMNS
157. 22 Jan 2015 “Digital Earth: Silk Road,” with Bob Raynolds, Gates Planetarium, DMNS
158. 21 Jan 2015 “Cosmic Cruisin’” tour for Denver Zoo, DMNS
159. 20 Jan 2015 *Living Planet, Part I* Class with Bob Raynolds, DMNS
160. 14 Jan 2015 New Members Night “Tours of the Universe,” DMNS
161. 11 Dec 2014 “Digital Earth: Mesa Verde,” with Bob Raynolds and Stephen Nash, Otterbox Theater, Ft. Collins Museum of Discovery
162. 19 Nov 2014 “60 Minutes in Space” monthly presentation, DMNS
163. 15 Nov 2014 “Dark Matter” presentation for Urban Advantage, DMNS
164. 29 Oct 2014 “60 Minutes in Space” monthly presentation, DMNS
165. 23 Oct 2014 “Digital Earth: Whence and Wither? (Human Migration),” with Bob Raynolds, Gates Planetarium, DMNS
166. 18 Oct 2014 “A Global Water Story,” with Bob Raynolds for Inquiry Academy, Gates Planetarium, DMNS
167. 28 Aug 2014 “Digital Earth: Mesa Verde,” with Bob Raynolds and Stephen Nash, Gates Planetarium, DMNS
168. 27 Aug 2014 “60 Minutes in Space” monthly presentation, DMNS
169. 21 Aug 2014 “Alien Worlds” talk for “Science Lounge: Exoplanets and Aliens,” DMNS
170. 16 Aug 2014 “Interactive Tour of the Universe” for *Out of this World* John McConnell Math & Science Center of Western Colorado fundraiser, Grand Junction, CO
171. 23 Jul 2014 *Sci-Fi Film Series* discussion for *Europa Report*, Sie Center, Denver, CO
172. 23 Jul 2014 Research Experiences for Undergraduates Career Panel, LASP, Boulder, CO

173. 18 Jul 2014 “Ka Chun Yu on Using Immersive Domes to Create Compelling & Effective Visualizations for Education & Group Discussions on Ecological Issues,” interview with Voices of VR Podcast
174. 12 Jul 2014 “Animal Migrations,” Synra Dome, Tokyo Science Museum, Tokyo, Japan
175. 13 Jun 2014 “Tour of the Universe” for Cosmic Cruisin’, Gates Planetarium, DMNS
176. 08 Jun 2014 “Immersive Fulldome Theaters: Exploring Extreme Fields of View for Astronomy Education,” iED 2014 (Immersive Education), Los Angeles, CA
177. 08 Jun 2014 iED 2014 (Immersive Education) panel, Los Angeles, CA
178. 15 May 2014 “Science Lounge: Archaeoastronomy” talk with Stephen Nash, Gates Planetarium, DMNS
179. 10 May 2014 “Tour of the Universe” for Monty Cleworth Wine Tasting and Planetarium show (MAD Auction private event), Gates Planetarium, DMNS
180. 10 May 2014 “Tour of the Universe” presentations for Space Day, Gates Planetarium, DMNS
181. 12 Apr 2014 “Gravitational Waves, Polarization, and the Big Bang,” Yuri’s Night Out talk at the Secular Hub, 3100 Downing #C, Denver
182. 19 Mar 2014 “60 Minutes in Space” monthly presentation, DMNS
183. 17 Mar 2014 “Cruisin’ the Cosmos” talk for Foundations Academy, Gates Planetarium, DMNS
184. 05 Mar 2014 “Digital Earth: Colorado Flooding” with Bob Raynolds, Gates Planetarium, DMNS
185. 27 Feb 2014 *Geology Study Group* Class with Bob Raynolds, Gates Planetarium, DMNS
186. 26 Feb 2014 “60 Minutes in Space” monthly presentation, DMNS
187. 25 Feb 2014 “Digital Earth: Colorado Flooding” with Bob Raynolds, Gates Planetarium, DMNS
188. 24 Feb 2014 “Careers with the Public” Beyond Boulder talk
189. 20 Feb 2014 “Tours of the Universe” talks at “Science Lounge: Space Camp”
190. 18 Feb 2014 “Digital Earth: Fire and Light” remote Octopus session for California Academy of Sciences
191. 31 Jan 2014 “Digital Earth: Sea Level Rise” with Bob Raynolds, Gates Planetarium, DMNS
192. 29 Jan 2014 “60 Minutes in Space” monthly presentation, DMNS
193. 28 Jan 2014 “Digital Earth: Sea Level Rise” with Bob Raynolds, Gates Planetarium, DMNS
194. 16 Jan 2014 “Death by Astronomy” presentations for “Science Lounge: Apocalyptic,” IMAX Theater, DMNS
195. 4 Dec 2013 *Europa Report* discussion with Vincent Piturro, MSUD Science Fiction in Film class
196. 20 Nov 2013 “60 Minutes in Space” monthly presentation, DMNS
197. 11 Nov 2013 “Interactive Tours of the Universe,” Colorado Chautauqua Association, Boulder, CO
198. 11 Nov 2013 Mythbusters Exhibit Tour, DMNS
199. 6 Nov 2013 “Tours of the Universe” for Museum After Dark, Gates Planetarium, DMNS
200. 4 Nov 2013 “Digital Earth: Peru” with Bob Raynolds and Michele Koons, Gates Planetarium, DMNS
201. 29 Oct 2013 “Digital Planetariums for Engaging Public Audiences in Global Change Issues,” Geological Society of America, Denver, CO
202. 27–30 Oct 2013 GeoDome tours with Bob Raynolds, Geological Society of America, Denver, CO
203. 28 Oct 2013 Planetarium lecture for University of Denver class with Bob Raynolds, Gates Planetarium, DMNS
204. 21 Oct 2013 “Bringing the Planetarium to Earth: Community Dialogues for Ecological Resilience,” ASTC 2013 Conference, Albuquerque, NM
205. 9 Oct 2013 “Massive Star Formation” Curator’s Lunchtime Lecture, Ricketson Auditorium, DMNS

206. 26 Sep 2013 “Worldviews Network 14: The National Park Service in a Changing World,” Gates Planetarium, DMNS, Denver, CO and Ft Collins Museum of Discovery, Ft. Collins, CO
207. 24 Sep 2013 Digital Earth: Africa Revisited with Bob Raynolds, Gates Planetarium, DMNS
208. 12 Sep 2013 Ornithology Class with Andy Doll, Gates Planetarium, DMNS
209. 8 Aug 2013 “Tours of the Universe” for *Changing Landscapes of Science: Space, The Last Frontier* lecture series, John McConnell Math & Science Center of Western Colorado, Grand Junction, CO
210. 18 Jul 2013 Charged Particle and Van der Graaf Generator demonstrations for “Science Lounge: Electricity,” DMNS
211. 17 Jul 2013 *Sci-Fi Film Series* discussion on *Primer*, Sie FilmCenter, Denver, CO
212. 16 Jul 2013 “Beetles and Forests Digital Earth,” with Bob Raynolds, Ft. Collins Discovery Museum, Ft. Collins, CO
213. 2 Jul 2013 “Dancing with the Stars (tango lesson),” Aspen Ideas Festival, Aspen, CO
214. 2 Jul 2013 “The Great Transition Begins” with Bob Raynolds, Aspen Ideas Festival, Aspen, CO
215. 1 Jul 2013 “Perceiving Home: New Perspectives on Our Changing Planet,” Aspen Ideas Festival, Aspen, CO
216. 1 Jul 2013 “Liquid Gold: Are We Taking Water for Granted?” with Bob Raynolds, Aspen Ideas Festival, Aspen, CO
217. 1 Jul 2013 “Interactive Tour of the Observable Universe,” Aspen Ideas Festival, Aspen, CO
218. 30 Jun 2013 “Perceiving Home: New Perspectives on Our Changing Planet,” Aspen Ideas Festival, Aspen, CO
219. 30 Jun 2013 “Interactive Tour of the Observable Universe,” Aspen Ideas Festival, Aspen, CO
220. 30 Jun 2013 “Music, Contemplation, and the Cosmos,” Aspen Ideas Festival, Aspen, CO
221. 29 Jun 2013 “Fire and Lights: Mankind Illuminating the Cosmos” with Bob Raynolds, Aspen Ideas Festival, Aspen, CO
222. 28 Jun 2013 “The World’s Most Awesome Stargazing Event at 11,212 Feet: Stargazing, Aspen Ideas Festival,” Aspen, CO
223. 28 Jun 2013 “The World’s Most Awesome Stargazing Event at 11,212 Feet: Storytelling,” Aspen Ideas Festival Aspen, CO
224. 28 Jun 2013 “Perceiving Home: New Perspectives on Our Changing Planet,” Aspen Ideas Festival, Aspen, CO
225. 28 Jun 2013 “Interactive Tour of the Observable Universe,” Aspen Ideas Festival, Aspen, CO
226. 27 Jun 2013 “Liquid Gold: Are We Taking Water for Granted?” with Bob Raynolds, Aspen Ideas Festival, Aspen, CO
227. 27 Jun 2013 “Interactive Tour of the Observable Universe,” Aspen Ideas Festival, Aspen, CO
228. 27 Jun 2013 “Fire and Lights: Mankind Illuminating the Cosmos” with Bob Raynolds, Aspen Ideas Festival, Aspen, CO
229. 27 Jun 2013 “Interactive Tour of the Observable Universe,” Aspen Ideas Festival Aspen, CO
230. 26 Jun 2013 “Interactive Tour of the Observable Universe, Aspen Ideas Festival Aspen, CO
231. 26 Jun 2013 “Interactive Tour of the Observable Universe,” Aspen Ideas Festival, Aspen, CO
232. 26 Jun 2013 “Liquid Gold: Are We Taking Water for Granted?” with Bob Raynolds, Aspen Ideas Festival, Aspen, CO
233. 14 Jun 2013 Space Tour for Marshall Turner and guests, DMNS
234. 13 Jun 2013 “Tours of the Universe” Orbits Table presentations for New Members Night, DMNS
235. 12 Jun 2013 Aurora Public Schools Migrant Program tour of Space Odyssey, DMNS
236. 12 Jun 2013 “Tour of the Universe” for Space Odyssey 10th Anniversary Party, Gates Planetarium, DMNS

237. 7 Jun 2013 “Pub Science” GeoDome presentation with Bob Raynolds, Durango Discovery Museum, Durango, CO
238. 7 Jun 2013 “Tours of the Universe” GeoDome presentation, Durango Discovery Museum, Durango, CO
239. 6 Jun 2013 “Water in the Animas, San Juan, and Colorado Rivers” GeoDome presentation with Bob Raynolds, Durango Discovery Museum, Durango, CO
240. 6 Jun 2013 “Geology of the Mesa Verde Area” GeoDome presentation with Bob Raynolds, Durango Discovery Museum, Durango, CO
241. 6 Jun 2013 “Geological Setting for the San Juan Basin and the Four Corners Region” GeoDome presentation with Bob Raynolds Durango Discovery Museum, Durango, CO
242. 6 Jun 2013 “Water in the World” GeoDome presentation with Bob Raynolds, Durango Discovery Museum, Durango, CO
243. 4 Jun 2013 “Issues of Today: Impacts of the Mountain Pine Beetle Outbreak” presentation with Bob Raynolds, Gates Planetarium, DMNS
244. 29 May 2013 “60 Minutes in Space” monthly presentation, DMNS
245. 16 May 2013 Venus talk at Young Professionals Pre-Science Lounge, DMNS
246. 16 May 2013 Transit of Venus presentation for “Science Lounge: Venus,” Gates Planetarium, DMNS
247. 11 May 2013 “Tours of the Universe” Orbits Table presentations for Space Day, DMNS
248. 26 Apr 2013 Interview with Krystin Zwolinski’s class, York International School, Thornton, CO
249. 20 Mar 2013 “60 Minutes in Space” monthly presentation, DMNS
250. 19 Mar 2013 “Digital Earth: Fire and Light” talk with Bob Raynolds, Gates Planetarium, DMNS
251. 7 Feb 2013 “Conversations About Sharon Harper’s Exhibit of the Night Skies” with Jeanne Liotta, CPAC, Lakewood, CO
252. 30 Jan 2013 “APS Panel Discussion on Post-Graduate Careers,” Boulder, CO
253. 22 Jan 2013 “Digital Earth: Beetles” talk with Bob Raynolds, Gates Planetarium, DMNS
254. 19 Jan 2013 Dome tour and demonstrations for Urban Advantage Teen Leaders, Gates Planetarium, DMNS
255. 15 Jan 2013 Planetarium presentation for Egypt Study Society with Bob Raynolds, Gates Planetarium, DMNS
256. 12 Dec 2012 “Filmmaking for the Fulldome: Movie-making Best Practices for the Planetarium” presentation for Curator’s Lunchtime Lecture, Gates Planetarium, DMNS
257. 6 Dec 2012 “Behind the Scenes Gates Planetarium” tour, DMNS
258. 27 Nov 2012 Plate Tectonics Class Forum with Bob Raynolds, DMNS
259. 13 Nov 2012 “The Science and History of Solar Eclipses,” MacNichols Building, Denver, CO
260. 13 Nov 2012 “Digital Earth: Kaiparowits Fossil Dig” talk with Ian Miller and Joe Sertich, Gates Planetarium, DMNS
261. 20 Oct 2012 “Tours of the Universe” Orbits Table presentations for Astronomy Day, DMNS
262. 8 Oct 2012 “Digital Earth for Egypt Study Society” talk with Bob Raynolds, Gates Planetarium, DMNS
263. 16 Aug 2012 “Science Lounge: Big Bang Theory” presentations with Dimitri Klebe, DMNS
264. 9 Aug 2012 “Tours of the Universe” Orbits Table presentations for Development, DMNS
265. 18 Jul 2012 *Sci-Fi Film Series* Talk on *Monsters*, Denver FilmCenter, Denver, CO
266. 13 Jul 2012 “Digital Earth: Fire in the Mountains” talk with Bob Raynolds, Gates Planetarium, DMNS
267. 28 Jun 2012 “Tours of the Universe” Orbits Table presentations for Development, DMNS
268. 28 Jun 2012 “Digital Earth: Fire in the Mountains” talk with Bob Raynolds, Gates Planetarium, DMNS

269. 22 Jun 2012 “Digital Earth: Fire in the Mountains” talk with Bob Raynolds, Gates Planetarium, DMNS
270. 9 Jun 2012 “KT Challenge Event: A Real and Virtual Tour of the Denver Basin’s Water Resources” tour with Bob Raynolds, DMNS dioramas, field locations, and Gates Planetarium, DMNS
271. 5 Jun 2012 “Digital Earth: Venus transit” talk with Bob Raynolds, Gates Planetarium, DMNS
272. 23 May 2012 “Digital Earth: Egypt” talk with Bob Raynolds, Gates Planetarium, DMNS
273. 16 Apr 2012 “Climate and Global Change” presentation with Bob Raynolds, Gates Planetarium, DMNS
274. 28 Mar 2012 “60 Minutes in Space” monthly presentation, DMNS
275. 23 Mar 2012 “Exploring Earth from Space” presentation with Bob Raynolds, Gates Planetarium, DMNS
276. 8 Mar 2012 “Beyond Physics: Careers in Outreach and Policy” panel, Boulder, CO
277. 29 Feb 2012 “60 Minutes in Space” monthly presentation, DMNS
278. 24 Feb 2012 “The Hubble Space Telescope” talk for Mixed Taste, Museum of Contemporary Art, Denver, CO
279. 31 Jan 2012 *Our Living Planet, Part III* Class with Bob Raynolds, Gates Planetarium, DMNS
280. 24 Jan 2012 *Our Living Planet, Part II* Class with Bob Raynolds, Gates Planetarium, DMNS
281. 17 Jan 2012 *Our Living Planet, Part I* Class with Bob Raynolds, Gates Planetarium, DMNS
282. 13 Dec 2011 “Digital Earth: Exploration” talk for Polaris Ebert 5th graders with Bob Raynolds, Gates Planetarium, DMNS
283. 29 Nov 2011 Planetarium tour for MSUD GIS Club, Gates Planetarium, DMNS
284. 19 Nov 2011 “Uniview Tours of the Universe” presentation for Urban Advantage 2nd Annual Family Science Day, Gates Planetarium, DMNS
285. 9 Nov 2011 “Digital Earth: Grand Canyon” talk with Bob Raynolds, Gates Planetarium, DMNS
286. 19 Oct 2011 Chaco Canyon Science in Action presentation, Gates Planetarium, DMNS
287. 30 Jul 2011 Astronomy talk for Magic Bus Tour of Colorado, for Development and Leadership Circle donors, DMNS
288. 15 Jul 2011 “Water on Earth” presentations in GeoDome, DSST Middle School, Denver, CO
289. 14 Jul 2011 “Water on Earth” presentations in GeoDome, DSST Middle School, Denver, CO
290. 13 Jul 2011 “Re-Imagining Worldviews: Digital Planetarium Programs for Ecological Literacy” presentation for Curator’s Lunchtime Lecture, Ricketson Auditorium, DMNS
291. 13 Jun 2011 “Tour of the Universe” presentation for Space Odyssey Recognition Dinner, Gates Planetarium, DMNS
292. 24 Mar 2011 “Issues of Today: A Global Water Story” presentation with Bob Raynolds, Gates Planetarium, DMNS
293. 27 Apr 2011 “60 Minutes in Space” monthly presentation, DMNS
294. 25 Apr 2011 Visualization support for “Resources in the World” class with Bob Raynolds and Vince Matthews, Gates Planetarium, DMNS
295. 25 Apr 2011 “Uniview demonstration” for DSST-Cole Earth Science Program, Gates Planetarium, DMNS
296. 21 Apr 2011 “Science Lounge: Science and Art” presentation, DMNS
297. 15 Apr 2011 “Tours of the Universe” presentation for Native American Science Career Day, Gates Planetarium, DMNS
298. 9 Apr 2011 “Tours of Earth and the Universe” presentations for Earth Day, Gates Planetarium, DMNS
299. 9 Apr 2011 “Tours of the Universe” Orbits Table presentations for Yuri’s Night Out Celebration, Space Odyssey, DMNS

300. 7 Apr 2011 "Tours of the Universe" Orbits Table presentations for New Member Night, Space Odyssey, DMNS
301. 6 Apr 2011 Introduction to Jon Waterman and Peter McBride art opening, IMAX Theater, DMNS
302. 30 Mar 2011 "60 Minutes in Space" monthly presentation, DMNS
303. 16 Mar 2011 "Water in the West" Worldviews Network bioregional narrative in development presentation with Bob Raynolds, Gates Planetarium, DMNS
304. 25 Feb 2011 "Astronomy Overview with Uniview," talk, Smoky Hills High School, Aurora, CO
305. 24 Feb 2011 "Digital Earth: Earthquakes and Plate Tectonics" talk with Bob Raynolds, Gates Planetarium, DMNS
306. 22 Feb 2011 "Water in the West" Worldviews Network presentation with Bob Raynolds, Gates Planetarium, DMNS
307. 17 Feb 2011 Science Lounge presentation with David Grinspoon, Gates Planetarium, DMNS
308. 9 Feb 2011 "Water in the West" Worldviews Network presentation with Bob Raynolds, Gates Planetarium, DMNS
309. 3 Feb 2011 "Beyond Boulder" Physics/Astronomy Undergraduate Career panel, Boulder, CO
310. 28 Jan 2011 "Behind the Scenes Gates Planetarium" tour, DMNS
311. 27 Jan 2011 "Water in the West" Worldviews Network Domecast presentation with Bob Raynolds to University of Georgia-Athens
312. 25 Jan 2011 "Behind the Scenes Gates Planetarium" tour, DMNS
313. 16 Dec 2010 "Worldviews Network Tour of Space and Earth," talk with Bob Raynolds, "Igloo" GeoDome, California Academy of Sciences NightLife event
314. 17 Nov 2010 "60 Minutes in Space" monthly presentation, DMNS
315. 17 Nov 2010 "Digital Earth: Plate Tectonics for 1st Graders" talk with Bob Raynolds, Gates Planetarium, DMNS
316. 12 Nov 2010 "Tours of the Universe" presentation, Zuni Pueblo Middle School general science classes, Zuni, New Mexico
317. 11 Nov 2010 "Tours of the Universe" presentation, Laguna-Acoma High School physics class, Laguna, New Mexico
318. 11 Nov 2010 "Tours of the Universe" presentation, Laguna-Acoma High School calculus class, Laguna, New Mexico
319. 9 Nov 2010 "Scientists in Action: Chaco Canyon" presentation broadcast back to the Gates Planetarium, DMNS
320. 16 Oct 2010 "Tours of the Universe" Orbits Table presentations for Space Day, Space Odyssey exhibit, DMNS
321. 7 Oct 2010 Space Sciences update for All Staff Meeting, Ricketson Auditorium, DMNS
322. 29 Sep 2010 "60 Minutes in Space" monthly presentation, DMNS
323. 28 Sep 2010 Uniview VJ for Robert Henke/Monolake show, Gates Planetarium, DMNS
324. 1 Sep 2010 "Digital Earth: Exploring Our World from Space – Water" talk with Bob Raynolds, Gates Planetarium, DMNS
325. 25 Aug 2010 "60 Minutes in Space" monthly presentation, DMNS
326. 5 Aug 2010 "Tour of the Universe," Gates Planetarium, DMNS
327. 20 Jul 2010 "Digital Earth: Exploring Our World from Space" talk with Kirk Johnson, Gates Planetarium, DMNS
328. 17 Jun 2010 Science Lounge presentation, DMNS
329. 26 May 2010 "Future Discoveries of Exoplanets" Curator's Lunchtime Lecture, Ricketson Auditorium, DMNS
330. 14 May 2010 "Tour of the Universe" presentation with Bob Raynolds for Native American Science Career Day, Gates Planetarium, DMNS



331. 8 May 2010 "Tours of the Universe" Orbits Table presentations for Space Day, Space Odyssey, DMNS
332. 5 May 2010 "A Short History of Media for Immersive Art: The Past Informing the Future," lecture for Digital Cinema, Theory & Practice class, University of Denver
333. 10 Mar 2010 "Digital Earth: Continental Drift and Plate Tectonics" talk with Bob Raynolds, Gates Planetarium, DMNS
334. 3 Feb 2010 "The Big Bang, Dark Energy, and Beyond," talk for the American Council of Engineering Companies of Colorado, Lakewood, CO
335. 20 Jan 2010 "Tour of the Universe," McLain Community School
336. 19 Jan 2010 "Behind the Scenes Gates Planetarium" tour, DMNS
337. 13 Jan 2010 "Behind the Scenes Gates Planetarium" tour, DMNS
338. 20 Nov 2009 "Tour of the Universe," Colorado Science Conference, Merchandise Mart, Denver
339. 9 Nov 2009 "Digital Earth: Exploring Our World from Space" talk with Bob Raynolds, Gates Planetarium, DMNS
340. 24 Oct 2009 "Tours of the Universe" Orbits Table presentations for Astronomy Day, Space Odyssey, DMNS
341. 13 Oct 2009 "Digital Earth: Exploring Our World from Space" talk with Bob Raynolds, Gates Planetarium, DMNS
342. 8 Oct 2009 Uniview presentation for DMNS Climate Class, Gates Planetarium, DMNS
343. 3 Sep 2009 "The Big Bang and Beyond," The Origins and Evolution of Life, The Universe, and Everything lecture series, Ricketson Auditorium, DMNS
344. 21 Aug 2009 "Tour of the Universe," DMNS camp-in talk, Gates Planetarium, DMNS
345. 7 Aug 2009 "Tour of the Solar System," DMNS day camp behind-the-scenes talk, DMNS
346. 6 Aug 2009 "Tour of the Universe, Part II," Volunteer Family Fun Night, Gates Planetarium, DMNS
347. 6 Aug 2009 "Tour of the Universe, Part I," Volunteer Family Fun Night, Gates Planetarium, DMNS
348. 7 Jul 2009 "Digital Earth: Exploring Our World from Space – World Rivers and River Deltas" talk with Bob Raynolds, Gates Planetarium, DMNS
349. 7 Jul 2009 "Behind the Scenes Gates Planetarium" tour for Volunteer Enrichment Committee, DMNS
350. 24 Jun 2009 "60 Minutes in Space" monthly presentation, DMNS
351. 11 Jun 2009 "A History of Our View of the Universe," Space Odyssey party talk, Gates Planetarium, DMNS
352. 10 Jun 2009 Visualization support for "Colorado Skies" talk with Larry Sessions, Gates Planetarium, DMNS
353. 21 May 2009 Panelist judge for Physics and Engineering senior projects, Denver School of Science and Technology, Denver, CO
354. 20 May 2009 "A Short History of Media for Immersive Art: The Past Informing the Future," lecture for Digital Cinema Theory and Practice class, University of Denver
355. 19 May 2009 "Digital Earth: Exploring Our World from Space" talk with Bob Raynolds, Gates Planetarium, DMNS
356. 1 May 2009 "Tours of the Universe" Orbits Table presentations for Space Day, Space Odyssey, DMNS
357. 28 Apr 2009 "Tours of the Universe" talk at the Greeley Middle School Career Fair, AIM CC
358. 25 Mar 2009 "60 Minutes in Space" monthly presentation, DMNS
359. 11 Mar 2009 Visualization support for "Colorado Skies" talk with Larry Sessions, Gates Planetarium, DMNS
360. 10 Mar 2009 "Digital Earth: Exploring Our World from Space" talk with Bob Raynolds, Gates Planetarium, DMNS

361. 9 Mar 2009 “3D Models for Uniview,” talk for animation class, Smoky Hills High School, Aurora, CO
362. 12 Feb 2009 Physics Career Panel, University of Colorado, Boulder, CO
363. 13 Jan 2009 “Digital Earth: Exploring Our World from Space – Long Faults” talk with Bob Reynolds, Gates Planetarium, DMNS
364. 19 Nov 2008 “60 Minutes in Space” monthly presentation, DMNS
365. 11 Nov 2008 “Geography Goes Digital Live!” talk with Bob Reynolds, Gates Planetarium, DMNS
366. 28 Oct 2008 “Geography Goes Digital Live!” talk with Bob Reynolds, Gates Planetarium, DMNS
367. 15 Oct 2008 Visualization support for “Colorado Skies” talk with Larry Sessions, Gates Planetarium, DMNS
368. 7 Oct 2008 “Geography Goes Digital Live!” talk with Bob Reynolds, Gates Planetarium, DMNS
369. 4 Oct 2008 “Tours of the Universe” Orbits Table presentations for Space Day, Space Odyssey, DMNS
370. 24 Sep 2008 “60 Minutes in Space” monthly presentation, DMNS
371. 9 Sep 2008 “Hidden Treasures of the Collections: Gates Planetarium” tour, DMNS
372. 25 Aug 2008 “Tour of the Universe” talk and demo for Lockheed Martin/USF DNC event, Gates Planetarium, DMNS
373. 20 Aug 2008 “60 Minutes in Space” monthly presentation, DMNS
374. 9 Jul 2008 Uniview flight for COGA talk with Bob Reynolds, Gates Planetarium, DMNS
375. 9 Jul 2008 “Astrophysical Visualizations for Digital Planetariums” Curator’s Lunchtime Lecture, Ricketson Auditorium, DMNS
376. 20 Jun 2008 “Astronomy Learning in Immersive Virtual Environments,” ALIVE Open House, DMNS
377. 19 Jul 2008 Uniview flight for “Weird Moons” talk with John Spencer, Gates Planetarium, DMNS
378. 13 Jun 2008 “Tour the Universe,” talk and demonstration Space Odyssey 5th Anniversary Party, Gates Planetarium, DMNS
379. 11 Jun 2008 “Geography Goes Digital III” talk with Bob Reynolds, Gates Planetarium, DMNS
380. 25 May 2008 Co-host for Phoenix Lander landing event, Gates Planetarium, DMNS
381. 22 May 2008 “Geography Goes Digital II” talk with Bob Reynolds, Gates Planetarium, DMNS
382. 2 May 2008 “Tour of the Universe,” Orbits Table presentations for Space Day, Space Odyssey, DMNS
383. 30 Apr 2008 “60 Minutes in Space” monthly presentation, DMNS
384. 22 Apr 2008 Uniview flight for “Exploring Earth from Space” talk with Bob Reynolds at Global Immersion Workshop, Gates Planetarium, DMNS
385. 21 Apr 2008 “Full-dome Planetariums for Astronomy Instruction,” talk at Global Immersion Workshop, Gates Planetarium, DMNS
386. 21 Apr 2008 Uniview flight for “Astrobiology” talk with David Grinspoon at Global Immersion Workshop, Gates Planetarium, DMNS
387. 16 Apr 2008 “Geography Goes Digital I” talk with Bob Reynolds, Gates Planetarium, DMNS
388. 10 Apr 2008 “Adventures in Planetariums, Outreach and Other Things,” lecture to Astro 4010 Astrophysics Research seminar, T. Snow, University of Colorado at Boulder
389. 27 Feb 2008 “60 Minutes in Space” monthly presentation, DMNS
390. 5 Feb 2008 “Dark Energy in the Universe,” talk for Golden High School senior seminar
391. 24 Jan 2008 “Hidden Treasures of the Collections: Gates Planetarium” tour, DMNS
392. 17 Jan 2008 “Knowing Your Audience: Astronomy Misconceptions by the Public,” talk and discussion with staff and Galaxy Guide volunteers, DMNS
393. 15 Jan 2008 “Hidden Treasures of the Collections: Gates Planetarium” tour, DMNS

394. 15 Jan 2008 “Tour of the Universe,” talk and demonstration for DMNS Board of Trustees, DMNS
395. 14 Jan 2008 “Knowing Your Audience: Astronomy Misconceptions by the Public,” talk and discussion with staff and Galaxy Guide volunteers, DMNS
396. 30 Nov 2007 Dome demonstrations for Hewlett-Packard workstation group, Gates Planetarium, DMNS
397. 13 Nov 2007 Dome demonstrations for Air Force Academy group, Gates Planetarium, DMNS
398. 7 Nov 2006 Talk for Logan School students with Joel Michor, DMNS
399. 29–30 Oct 2007 “Geospatial Data Presentations in Planetariums,” demonstrations for Geological Society of America conference attendees, Gates Planetarium, DMNS
400. 26 Sep 2007 “60 Minutes in Space” monthly presentation, DMNS
401. 29 Aug 2007 “60 Minutes in Space” monthly presentation, DMNS
402. 2 Aug 2007 “Dark Energy in the Universe,” *Mixed Taste* talk at the Belmar Laboratory for Art and Ideas, Lakewood, CO
403. 13–15 Jul 2007 DMNS Colorado River Stargazing canoe trip lecturer, Colorado River, CO
404. 20 Jun 2007 “Astronomy Learning in Immersive Virtual Environments,” Curator’s Lunchtime Lecture, DMNS
405. 30 May 2007 “60 Minutes in Space” monthly presentation, DMNS
406. 11 May 2007 “Astronomy Learning in Immersive Virtual Environments,” ALIVE Open House, DMNS
407. 3 May 2007 “Dark Energy,” Space Day lecture, Space Odyssey, DMNS
408. 3 May 2007 Discussion panel member for Astro 4010, Astrophysics Research seminar, T. Snow, University of Colorado at Boulder
409. 30 Apr 2007 Planetarium star talk and lecture for Colorado School of Mines, Gates Planetarium, DMNS
410. 25 Apr 2007 “60 Minutes in Space” monthly presentation, DMNS
411. 20 Apr 2007 “Evening in Space” star talk and lecture, Gates Planetarium, DMNS
412. 17 Apr 2007 Planetarium star talk and lecture for CCD ACES class, Gates Planetarium, DMNS
413. 16 Apr 2007 Planetarium star talk and lecture for 1st grade class, Gates Planetarium, DMNS
414. 20 Mar 2007 “Cosmological Origins,” Volunteer Enrichment Committee brownbag lunch lecture, DMNS
415. 13 Mar 2007 “Cosmological Origins: The Universe, Galaxies, and Stars,” Volunteer Enrichment Committee lecture, DMNS
416. 12 Mar 2007 “An Evening in Space” star talk and lecture, Gates Planetarium, DMNS
417. 5 Mar 2007 “An Evening in Space” star talk and lecture, Gates Planetarium, DMNS
418. 28 Feb 2007 “60 Minutes in Space” monthly presentation, DMNS
419. 11 Jan 2007 “Real-time Uniview Demonstration” star talk and lecture for Hewlett-Packard, Gates Planetarium, DMNS
420. 6 Dec 2006 Visualization Set-up for John Dubinski’s “Future Sky: A Whimsical Look at the Fate of the Milky Way” talk, Gates Planetarium, DMNS
421. 20 Nov 2006 Talk for Logan School students with Joel Michor, DMNS
422. 13 Nov 2006 Planetarium star talk and lecture for Hewlett-Packard/Intel’s Quad Fest, Gates Planetarium, DMNS
423. 9 Nov 2006 Visualization Set-up for Dava Sobel talk and book signing, Gates Planetarium, DMNS
424. 25 Oct 2006 “60 Minutes in Space” monthly presentation, DMNS
425. 19 Oct 2006 Talk for Logan School students with Joel Michor, DMNS
426. 27 Sep 2006 “60 Minutes in Space” monthly presentation, DMNS

- 427. 30 Aug 2006 “60 Minutes in Space” monthly presentation, DMNS
- 428. 11–13 Aug 2006 DMNS Perseids Meteor Shower canoe trip lecturer, Gunnison River, CO
- 429. 9 Aug 2006 “A Short History of Immersive Art,” Curator’s Lunchtime Lecture, DMNS
- 430. 29 Jul 2006 Visualization Set-up for Axel Mellinger talk, Gates Planetarium, DMNS
- 431. 28 Jun 2006 “60 Minutes in Space” monthly presentation, DMNS
- 432. 24 May 2006 Introduction to John Bally Lifelong Learning evening talk, Gates Planetarium, DMNS
- 433. 3 May 2006 “Updates in Space Science” talk for LUMC Optimist Club, Littleton, CO
- 434. 1 May 2006 Talk for Logan School students with Joel Michor, DMNS
- 435. 20 Apr 2006 “The Astrophysics of *Black Holes: The Other Side of Infinity*,” for “Third Thursday” Galaxy Guide talk, DMNS
- 436. 21 Mar 2006 Galaxy Guide Planetarium Tour, Gates Planetarium, DMNS
- 437. 9 Mar 2006 “Updates in Astronomy,” talk for Sertoma, Englewood, CO
- 438. 1 Mar 2006 Talk for University of Colorado Denver group in Gates Planetarium, DMNS
- 439. 25 Jan 2006 “60 Minutes in Space” monthly presentation, DMNS
- 440. 6 Jan 2006 Talk for Logan School students with Joel Michor, DMNS
- 441. 30 Nov 2005 “60 Minutes in Space” monthly presentation, DMNS
- 442. 27 Oct 2005 “60 Minutes in Space” monthly presentation, DMNS
- 443. 25 Oct 2005 Talk for Volunteer Family Fun Night, Gates Planetarium, DMNS
- 444. 31 Aug 2005 “60 Minutes in Space” monthly presentation, DMNS
- 445. 27 Jul 2005 “60 Minutes in Space” monthly presentation, DMNS
- 446. 29 Apr 2005 “60 Minutes in Space” monthly presentation, DMNS
- 447. 9 Apr 2005 Star talk for All Sky camp-in group, Gates Planetarium, DMNS
- 448. 29 Mar 2005 Introductory presentation before “Search for Life” show, Gates Planetarium, DMNS
- 449. 18 Mar 2005 “60 Minutes in Space” monthly presentation, DMNS
- 450. 10 Mar 2005 Planetarium tour and demonstration with Harris family and school group, Gates Planetarium, DMNS
- 451. 9 Apr 2005 Star talk to All-Sky camp-in group
- 452. 15 Mar 2005 Talk to Cub Scout Pack 79, Denver, CO
- 453. 26 Jan 2005 Curator’s Lunchtime Lecture, DMNS
- 454. 23 Oct 2004 Astronomy Day talk, DMNS
- 455. 25 Aug 2004 “60 Minutes in Space” monthly presentation, DMNS
- 456. 30 Jun 2004 “60 Minutes in Space” monthly presentation, DMNS
- 457. Oct 2000 Talk at American Institute of Aeronautics and Astronautics, University of Colorado chapter, Boulder, CO
- 458. Sep 2000 Talk at Denver Astronomical Society, Denver, CO

**Professional Development (meetings and trainings attended)**

- 1. 10-11 Jun 2019 OpenSpace ISI Meeting, American Museum of Natural History, New York City, NY
- 2. 8-9 May 2019 VISUALISE Conference, Exploratorium, San Francisco, SF
- 3. 2-5 Feb 2019 IMERSA Summit, COSI, Columbus, OH
- 4. 6–10 Jan 2019 American Astronomical Society, Meeting #233, Seattle, WA
- 5. 1–5 Jul 2016 International Planetarium Society conference, Toulouse, France

6. 3–7 Jun 2018 American Astronomical Society, Meeting #231, Washington, DC
7. 2-4 Apr 2016 OpenSpace ISI & Advisory Board Meeting, American Museum of Natural History, New York City, NY
8. 8 Jan 2018 Astronomy Engagement with Diverse Publics workshop, Washington, DC
9. 8–12 Jan 2018 American Astronomical Society, Meeting #231, Washington, DC
10. 8 Jan 2018 Astronomy Engagement with Diverse Publics Workshop, AAS Meeting, Washington, DC
11. 9 Oct 2017 Uniview Users Group Meeting, St. Louis, MO
12. 6–11 Aug 2017 Gordon Research Conference on Visualizations in Science & Education, Lewiston, ME
13. 20–22 Mar 2017 IEEE Virtual Reality 2017, Los Angeles, CA
14. 6–10 Mar 2017 Digistar 6 Training, Salt Lake City, UT
15. 22-26 Mar 2017 IMERSA Summit, Denver, CO
16. 25 Oct 2016 OpenSpace Advisory Board Meeting, American Museum of Natural History, New York City, NY
17. 23–24 Aug 2016 Immersive Education Summit 2016, Denver, CO
18. 11–12 Jul 2016 OpenSpace Meeting, American Museum of Natural History, New York, NY
19. 26 Jun–2 Jul 2016 Aspen Ideas Festival, Aspen, CO
20. 19–23 Jun 2016 International Planetarium Society conference, Warsaw, Poland
21. 16–20 May 2016 Communicating Astronomy with the Public, Medellín, Colombia
22. 16–20 Mar 2016 IMERSA Summit, Denver, CO
23. 30 Nov–1 Dec 2015 Alan Alda Communicating Science Workshop, DMNS
24. 17–20 Oct 2015 Association of Science-Technology Centers Annual Meeting, Montreal, Quebec, Canada
25. 21–22 Sep 2015 Uniview Users Group Meeting, California Academy of Sciences, San Francisco, CA
26. 27 Jun–4 Jul 2015 Aspen Ideas Festival, Aspen, CO
27. 20 Apr 2015 Future Earth Forum, Société des Arts Technologiques (SAT), Montreal, QC
28. 25 Feb–1 Mar 2015 IMERSA Summit, Denver, CO
29. 9–11 Nov 2014 International Society for Digital Earth Summit 2014, Nagoya, Japan
30. 4–5 Sep 2014 Boston Museum of Science Climate Change Education Symposium
31. 4–6 Aug 2014 Astronomical Society of the Pacific 2014 Annual Meeting, Burlingame, CA
32. 23–27 Jun 2014 International Planetarium Society conference, Beijing, China
33. 6–8 Jun 2014 iED 2014 (Immersive Education), Los Angeles, CA
34. 29 Apr–1 May 2014 NASA CP4SMP+ Reverse Site Visit, Huntsville, AL
35. 6–9 Mar 2014 IMERSA Summit, Denver, CO
36. 7–8 Oct 2013 Tri-Agency Climate Change Education PI Meeting, Arlington, VA
37. 18 Oct 2013 Setting the Agenda for Giant Screen Research, Workshop Albuquerque, NM
38. 19–22 Oct 2013 Association of Science & Technology Centers (ASTC), Albuquerque, NM
39. 27–30 Oct 2013 Geological Society of America Meeting Denver, CO

40. 11–13 Dec 2013 Uniview User Group Meeting, Vancouver, BC
41. 26–29 Aug 2013 8th International Symposium on Digital Earth 2013, Kuching, Malaysia
42. 16–17 Feb 2013 IMERSA Fulldome Summit
43. 14–15 Feb 2013 IMERSA Fulldome Workshop
44. 25–26 Oct 2012 Presence Live: ISPR 2012 Conference, Philadelphia, PA
45. 13–16 Oct 2012 Association of Science & Technology Centers (ASTC) conference, Columbus, OH
46. 17–18 Sep 2012 Uniview Users Group 2012 Meeting, Böchum, Germany
47. 7 Sep 2012 Western Art Alliance, Denver, CO
48. 5–7 Sep 2012 Jackson Hole Symposium 2012, DMNS, Denver, CO
49. 6–8 Aug 2012 Astronomical Society of the Pacific Annual Meeting, Tucson, AZ
50. 22–26 Jul 2012 International Planetarium Society Meeting, Baton Rouge, LA
51. 17–20 Apr 2012 NASA-NOAA-NSF Climate Change Education PI Meeting, Arlington, VA
52. 3–5 Feb 2011 IMERSA Summit, DMNS, Denver, CO
53. 7–11 Aug 2011 SIGGRAPH 2011, Vancouver, BC
54. 25–26 Jul 2011 Uniview Users Group Meeting, Killeen, TX
55. 3–5 May 2011 *Science On a Sphere* Users Network Meeting, Museum of Science and Industry, Chicago, IL
56. 16–17 Mar 2011 Worldviews Network Institute, DMNS, Denver, CO
57. 28 Feb–2 Mar 2011 NASA-NOAA-NSF Climate Change Education Principal Investigators Meeting, Fairfax, VA
58. 26–28 Oct 2010 Jackson Hole Symposium 2010, DMNS, Denver, CO
59. 1–4 Aug 2010 Astronomical Society of the Pacific/Geological Society of America Meeting, Boulder, CO
60. 26–30 Jun 2010 International Planetarium Society meeting, Alexandria, Egypt
61. 25–29 Apr 2010 Cosmic Serpent Workshop, Taos, NM
62. 11–14 Apr 2010 Uniview Users Meeting, Stockholm, Sweden
63. 3–5 Mar 2010 CAISE Informal Science Education Summit, Washington, DC
64. 1–2 Mar 2010 NASA CP4SMP Principal Investigators Meeting, Washington, DC
65. 17–19 Nov 2009 *Science On a Sphere* Users Network Workshop, NOAA, Boulder, CO
66. 25–27 Sep 2009 DomeFest 2009, Albuquerque, NM
67. 9–12 Sep 2009 6th International Symposium for Digital Earth, Beijing, China
68. 6–8 May 2009 Astro Viz Workshop, California Academy of Sciences, San Francisco, CA
69. 14–18 Mar 2009 IEEE Virtual Reality 2009 Conference, Lafayette, LA
70. 14–19 Dec 2008 American Geophysical Union Fall Meeting, San Francisco, CA
71. 17–21 Oct 2008 Association of Science & Technology Centers (ASTC) Conference, Philadelphia, PA
72. 3–5 Sep 2008 Viewing the Universe via the World Wide Web; a World Wide Telescope/Google Sky workshop, KICP/University of Chicago, Chicago, IL
73. 3 Jul 2008 DomeFest, Chicago, IL
74. 3 Jul 2008 Fulldome Workshop, Chicago, IL
75. 27 Jun–2 Jul 2008 International Planetarium Society Conference, Chicago, IL
76. 26–27 Mar 2008 Immersive Cinema Workshop, Plymouth, UK

77. 26–28 Nov 2007 3rd International Symposium on Visual Computing (ISCV07), South Lake Tahoe, CA
78. 8–11 Oct 2007 Communicating Astronomy with the Public 2007 conference, Athens, Greece
79. 5–7 Sep 2007 Astronomical Society of the Pacific 119th Annual Meeting, Chicago, IL
80. 5–9 Aug 2007 SIGGRAPH 2007, 34th International Conference on Computer Graphics and Interactive Techniques, San Diego, CA
81. 20–23 Jul 2007 DomeFest 2007, Albuquerque, NM
82. 1–6 Jul 2007 Gordon Research Conference on Science Visualization in Education, Bryant University, RI
83. 5–9 Jun 2007 5th International Symposium on Digital Earth, Berkeley, CA
84. 7–8 Dec 2006 NSF REESE Meeting, Washington, DC
85. 6–8 Nov 2006 Astro-Viz '06 Workshop, Pasadena, CA
86. 27–31 Oct 2006 Association of Science & Technologies Centers conference, Louisville, KY
87. 15–19 Sep 2006 Astronomical Society of the Pacific 118th Annual Meeting, Baltimore, MD
88. 29 Jul–3 Aug 2006 SIGGRAPH 2006, 33rd International Conference on Computer Graphics and Interactive Techniques, Boston, MA
89. 10–12 Jul 2006 Virtual Globes Conference, Boulder, CO
90. 7–9 Dec 2005 National Science Foundation (NSF) REC PI Meeting, Washington, DC
91. 17–18 Nov 2005 NASA Earth Explorer Institutes (NEEI) Earth Data Visualization Workshop, American Museum of Natural History (AMNH), New York City, NY
92. 31 Jul–4 Aug 2005 SIGGRAPH 2005, 32nd International Conference on Computer Graphics and Interactive Techniques, Los Angeles, CA
93. 15–17 Jul 2005 DomeFest 2005, Albuquerque, NM
94. 22–24 Jan 2005 NASA Explorer Institute workshop, Chabot Space & Science Center, Oakland, CA
95. 8–1 Aug 2004 SIGGRAPH 2004, 31st International Conference on Computer Graphics and Interactive Techniques, Los Angeles, CA
96. 6–10 Jun 2004 204th Annual American Astronomical Society meeting, Denver, CO

## Intern & Student Projects

1. 10 Jun–3 Aug 2019 Corinne Olsten & Andrew Samon, Teen Science Scholar, DMNS, for project “Investigating Undergraduate Student Knowledge About the Seasons”
2. 9 Jun–13 Aug 2014 Opal Harbour, Teen Science Scholar, DMNS, for project “Photogrammetry Using Stereo Image Strips of the Martian Surface”
3. Feb–Jul, 2013 Laurie Budke, Panoramic photography stitching volunteer, DMNS
4. Feb–Apr, 2013 Lillian Anderson, Panoramic photography stitching internship, Denver School of Science & Technology, Denver, CO
5. Jan 2013–2016 Cooper Wooten, Panoramic photography stitching volunteer, DMNS
6. Nov 2013–Feb 2014 Suleimon Jenkins, Panoramic photography stitching internship, Denver School of Science & Technology, Denver, CO
7. Sep–Nov 2012 Kyla Killinger, Panoramic photography stitching internship, Denver School of Science & Technology, Denver, CO
8. Jul–Aug 2012 Lucy Conklin, Panoramic photography stitching and scientific illustration internship, California State University-Monterey Bay, Seaside, CA
9. Sep–Nov 2010 Nathan Kaplan, 3D modeling internship, Denver School of Science & Technology, Denver, CO
10. Feb–Apr 2010 Nicolas Ortiz, 3D modeling internship, Denver School of Science & Technology, Denver, CO
11. Sep–Nov 2009 Molly Cheek, 3D modeling internship, Denver School of Science & Technology, Denver, CO

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| 12. | Mar–May 2009 | Abysolome Asmerom, Uniview module outreach research and writing internship, Denver School of Science & Technology, Denver, CO |
| 13. | Jan–May 2009 | Lydia Hooper, Worldviews Network GIS technical internship, University of Colorado-Denver, Denver, CO                          |
| 14. | Jan–Mar 2009 | Beau Brown, 3D modeling internship, Denver School of Science & Technology, Denver, CO   |
| 15. | Mar–May 2007 | Ian Clanton-Thuon, 3D modeling internship, Denver School of Science & Technology, Denver, CO                                  |
| 16. | Mar–May 2007 | Jan Warnstam, visualization internship, Nörrköping University, Sweden   |

## Open Datasets

1. Planetary Nebulae module development for Uniview (Nov 2013)
2. Globular Clusters module development for Uniview (Sep 2012)
3. Local Group of Galaxies module development for Uniview (Sep 2012)
4. Brent Tully V 8k module development for Uniview (Sep 2012)
5. Sloan Digital Sky Survey Data Release 7 module development for Uniview (Sep 2012)
6. Red Stars module development for Uniview (Sep 2012)
7. Bright Stars module development for Uniview (Sep 2012)
8. Exoplanet module development for Uniview (Jul 2011)
9. USGS EDC Ortho Urban (< 1 meter resolution) WMS layer XML file development for Uniview (Dec 2008)
10. Milky Way image module development for Uniview (Oct 2008)
11. HIPPARCOS star dataset and star names modules development for Uniview (Jan 2008)

## Observing Proposals Granted Time

1. IRTF, 2 nights, July 7–8 2006 (co-I)
2. Lick Observatory, 2 nights, Fall 2001 (co-I)
3. Calar Alto, 2 nights, Summer 2001 (PI)
4. FCRAO, Spring 2001 (co-I)
5. VLA, 8 h, Apr 2000 (PI)
6. SMTO HHT, 32 h, Fall 1999–Spring 2000 (PI)
7. OVRO, 5 tracks, Apr 1999 (co-I)
8. SMTO HHT, 50 h, Mar 1999 (PI)
9. OVRO, 8 tracks, May 1998 (co-I)
10. HST, NICMOS2, 15 orbits, Cycle 7 (co-I)
11. KPNO 4 m, Phoenix (NIR spectrograph), 3 nights, Nov 1997 (PI)
12. CTIO 1.5 m, CIRIM (NIR imager), 6 nights, Feb 1997 (PI)
13. KPNO 2.1 m, IRIM (NIR imager), 5 nights, Nov 1996 (PI)
14. CTIO 1.5 m, CIRIM (NIR imager), 4 nights, Apr 1996 (PI)
15. Apache Point 3.5 m, GRIM II (NIR imager), 4 nights, Jan 1996 (co-I)



## Computer Skills

**Programming Experience:** IDL (10+ yrs) with emphasis on image processing; VBA Excel (5+-yrs); PDL (4+-yrs); R (2-yr); HTML (7+ yrs); CSS (2+ yrs); web development (6 yrs), including use of CGI scripts (4+ yrs) and Javascript (2+ yrs); LaTeX (17+ yrs), TeX (7+ yrs); X-windows (12+ yrs), Perl (9+ yrs), UNIX shell scripts (4+ yrs); C (5+ yrs), Performer OpenGL (< 2 yr), IRAF command language (< 3 yrs), sed (< 2 yr); awk (< 2 yr); FORTRAN (3+ yr); JAVA 2 (1 yr; includes Sun Microsystems Java Programming Language training course SL-275).

**Operating System Experience:** UNIX SunOS and Solaris (13+ yrs), Ubuntu 7.04, 7.10, 8.04, 8.10, 9.04, 9.10, 10.04, 12.04, 14.04 (13+ years), Redhat Linux 6.2, 7.2, 7.3, 8.0 (5+ yrs), SuSE 9.2, 9.3 (2+ yrs), IRIX (3+ yrs), AIX (< 1 yr), Ultrix (< 1 yr); Macintosh OS (18 yrs); Microsoft Windows (12 yrs).

**Multimedia:** Adobe Photoshop (18+ yrs), Adobe Illustrator (13+ yrs), Gimp (17+ yrs), Inkscape (15+ yrs), Sketchup (9+ yrs), PTGui Pro (8+ yrs), Adobe AfterEffects (< 1 yr), AliasWavefront Maya (< 1 yr), Macromedia Director (< 1 yr).