

Contact info: Mustapha Ishak-Boushaki, Professor of Physics and Astrophysics
 Department of Physics, University of Texas at Dallas, EC36
 800 West Campbell Road, Richardson, TX, 75080.
 Email: mishak@utdallas.edu. Phone: 972-883-2815

Educational History:

Ph.D. in Cosmology and General Relativity (2003), Queen's University at Kingston, Canada
 B. Sc. in Physics (1998), University of Montreal, Canada
 B. A.Sc. in Computer Sciences (1994), University of Quebec at Montreal, Canada
 Research Associate, 01-01-2003 to 07-31-2005, Princeton University, New Jersey, USA

Employment History:

Professor	09-01-2015 - Present	University of Texas at Dallas
Associate Professor	09-01-2011 to 08-31-2015,	University of Texas at Dallas
Assistant Professor	08-01-2005 to 08-31-2011	University of Texas at Dallas
Research Associate,	01-01-2003 to 07-31-2005,	Princeton University, New Jersey
Lecturer,	Fall 2003 and Spring 2004,	Princeton University, New Jersey
Research Assistant,	07-01-1998 to 12-31-2002,	Queen's University, Kingston, Canada
Teaching assistant	07-01-1998 to 12-31-2002,	Queen's University, Kingston, Canada

Professional recognitions, honors and awards:

- 2021 Elected *Fellow* of the American Association of Advancement of Sciences (AAAS) with quote: "*For distinguished contributions to the field of theoretical cosmology, particularly for testing modifications to general relativity at cosmological scales, and for sustained excellence in teaching and mentoring of students.*"
- 2021 President's Teaching Excellence Award at the University of Texas at Dallas
- 2020 Granted *Builder Status* for the Legacy Survey of Space and Time – Dark Energy Science Collaboration. Among 37 recognized members over 1100 members.
- 2018-2019 Invited review article in Living Reviews in Relativity journal to cover the topic of "*Testing General Relativity at Cosmological Scales.*" Living Reviews in Relativity 22 (2019) 1-204
- 2018 *Award for Outstanding Teacher of the Year* from the School of Natural Sciences and Mathematics, University of Texas at Dallas
- 2013 *Robert S. Hyer Award* for Excellence in Mentoring and Research from the Texas Section of the American Physics Society. Jointly with graduate student Michael Troxel.
- 2013 Journal paper highlighted at Physical Review Letters as Editors' suggestion and selected for a synopsis in *Spotlighting Exceptional Research in Physics* website of the American Physical Society. Article: "Stringent Restriction from the Growth of Large-Scale Structure on Apparent Acceleration in Inhomogeneous Cosmological Models", Mustapha Ishak, Austin Peel, and M. A. Troxel. Phys. Rev. Lett. 111, 251302 (2013).

- 2008 Journal paper selected by Chief Editor Gerardus 't Hooft (Nobel Laureate in Physics 1999) to appear in the highlights of 2008 of the Foundation of Physics Journal. Article: "Remarks on the formulation of the cosmological constant/dark energy questions. Mustapha Ishak. Foundation of Physics Journal, 37:1470-1498 (2007).
- 2007 *Award for Outstanding Teacher of the Year* from the School of Natural Sciences and Mathematics, University of Texas at Dallas
- 2002-2004 Postdoctoral Fellowship for Excellence in Research and Leadership from the Natural Sciences and Engineering Research Council of Canada (NSERC).
- 2002 Journal Paper voted by the Editorial Board of Classical and Quantum Gravity Journal as one of the journal's highlights of 2002. Article title: Interactive Geometric Database, Including Exact Solutions of Einstein's Field Equations, Mustapha Ishak and Kayll Lake, Classical and Quantum Gravity 19, 505-514 (2002).

Research interests:

- The origin/cause of the acceleration of the expansion of the Universe: Cosmological Constant, Dark Energy, Extensions to General Relativity.
- Testing gravity (General Relativity) at cosmological scales
- Testing Dark Energy versus Modified Gravity at Cosmological Scales.
- Gravitational Lensing and applications to cosmology; Intrinsic Alignments of Galaxies.
- Constraining cosmological parameters and cosmological models using probes such as gravitational lensing, the cosmic microwave background (CMB), and supernova searches.
- Inhomogeneous Cosmological Models and Averaging Problem in Cosmology
- Selected topics in General Relativity and Exact Solutions to Einstein's Equations
- Projects at the intersection of modern cosmology and General Relativity
- Junction conditions for matching spacetimes and constructing wormholes and thin-shells
- Computer algebra (symbolic computing) and application to cosmology and General Relativity

Research funding and grants:

- PI, PI, Department of Energy, 2021-2023 (Project in Cosmology and Dark Energy)
- PI, PI, Department of Energy, 2018-2021 (Project in Cosmology and Dark Energy)
- PI, PI, Department of Energy, 2020-2021 (Project in Cosmology and Dark Energy)
- PI, National Science Foundation, 2018-2019 (Project in Gravitational Lensing)
- PI, National Science Foundation, 2015-2018 (Astrophysics and Gravitational Lensing)
- PI, The John Templeton Foundation, 2014-2017 (Project in Cosmology).
- PI, National Science Foundation, AAG program, 2011-2014 (Project in Astrophysics)
- PI, Department of Energy, Theory, 2010-2013 (Project in Cosmology and Dark Energy)
- PI, NASA Astrophysics Theory Program, 2009-2013 (Project in Cosmology)
- PI, Texas Space Grant Consortium, 2008 (Project in Astrophysics and Cosmic Acceleration)
- PI, From Corporate Sector, 2008 (Research Project I in Gravity & statistics)
- PI, From Corporate Sector, 2009 (Research Project II in Gravity & statistics)
- PI, Hoblitzelle foundation, 2006 (Grant to build a Computer Cluster).

Professional memberships:

- Member of the American Physical Society
- Member of the American Astronomy Society
- Member of American Association for the Advancement of Science
- Full Member of LSST Dark Energy Science Collaboration (DESC)
- Full member of the Dark Energy Spectroscopic Instrument Collaboration (DESI)

Student supervision and mentoring at UT-Dallas:**Graduated Ph.D. Students:**

1. James Richardson (graduated in May 2008). Working in the corporate sector
2. Jacob Moldenhaeur (graduated in May 2010). Assistant Professor and Acting Chair at Physics Department, University of Dallas, TX.
3. Anthony Nwankwo (graduated in May 2011). Working in the corporate sector.
4. Jason Dossett (graduated in May 2013). Research staff member at the Institute for Defense Analyses, Washington, DC
5. Michael Troxel (graduated in May 2014). Assistant Professor of Physics, Duke University.
6. Austin Peel (graduated in May 2015). Postdoctoral Research Position in Astrophysics at Laboratoire d'Astrophysique, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland.
7. Tharake Wijenayake (graduated in May 2016). Working as Senior Analyst in the corporate sector at Zack's Investment, Chicago, IL.
8. Ji Yao (graduated in May 2018). Working as postdoctoral research fellow at Shanghai Jiao Tong University.
9. Weikang Lin (graduated in August 2018). Working as postdoctoral research fellow at North Carolina State University. Carolina State University.
10. Eske Pederson (graduated in August 2021). Working as postdoctoral research fellow to Harvard University.

Current Ph.D. students:

1. Anish Agash (graduation expected in 2022)
2. Cristhian Garcia Quintero (graduation expected in 2024)
3. Leonel Medina (graduation expected in 2025)
4. Yunan Xie, (graduation expected in 2026)
5. Vinu Soraya Chamatka (graduation expected in 2028)

Masters' students supervised:

1. Chris Allison
2. Jeffrey Scott
3. John Thompson
4. Delilah Whittington
5. Brian Troup
6. Lee Caps

Undergraduate student supervised:

1. Katherine Morgan (undergraduate Thesis/research, 2006)
2. Lee Isaac Trawick, (undergraduate Thesis/research, 2006)
3. Sriram Nagaraj, (undergraduate Thesis/research, 2006)
4. Wendy Gartenberg, (undergraduate Thesis/research, 2007)
5. John Wilson (undergraduate Thesis/research, 2007)
6. Austin Peel (undergraduate Thesis/research, 2007)
7. Jason Dossett, (undergraduate Thesis/research, 2007 and 2008)
8. Tan Lee, (undergraduate Thesis/research, 2008)
9. John Thompson (Undergraduate Thesis/Research, 2008)
10. Lee Caps (undergraduate Thesis/research, 2009)
11. Thomas Griffins (Undergraduate Research Project, 2012)
12. Nathan Newton (Undergraduate Research Project, 2012)
13. Jonathan Woodbury (undergraduate Thesis/research, 2013)
14. Victor Lee (Undergraduate Research Project, 2015)
15. Joseph Burnet (undergraduate Thesis/research, 2015)
16. Cristhian Quintero (undergraduate research, 2016)
17. Logan Fox (undergraduate research, Spring and Fall 2017)
18. Lindsey Rayborn (undergraduate research, Spring and Fall 2016)
19. Leonel Medina (undergraduate research, 2018)
20. Aaron Boggs (REU: undergraduate research, Summer 2019)
21. Calvin Ross (undergraduate research, 2019-2020).
22. Orion Ning (REU: undergraduate research, Summer 2020)
23. Lael Verace (REU: undergraduate research, Summer 2021)

High-school and Clark students summer internships:

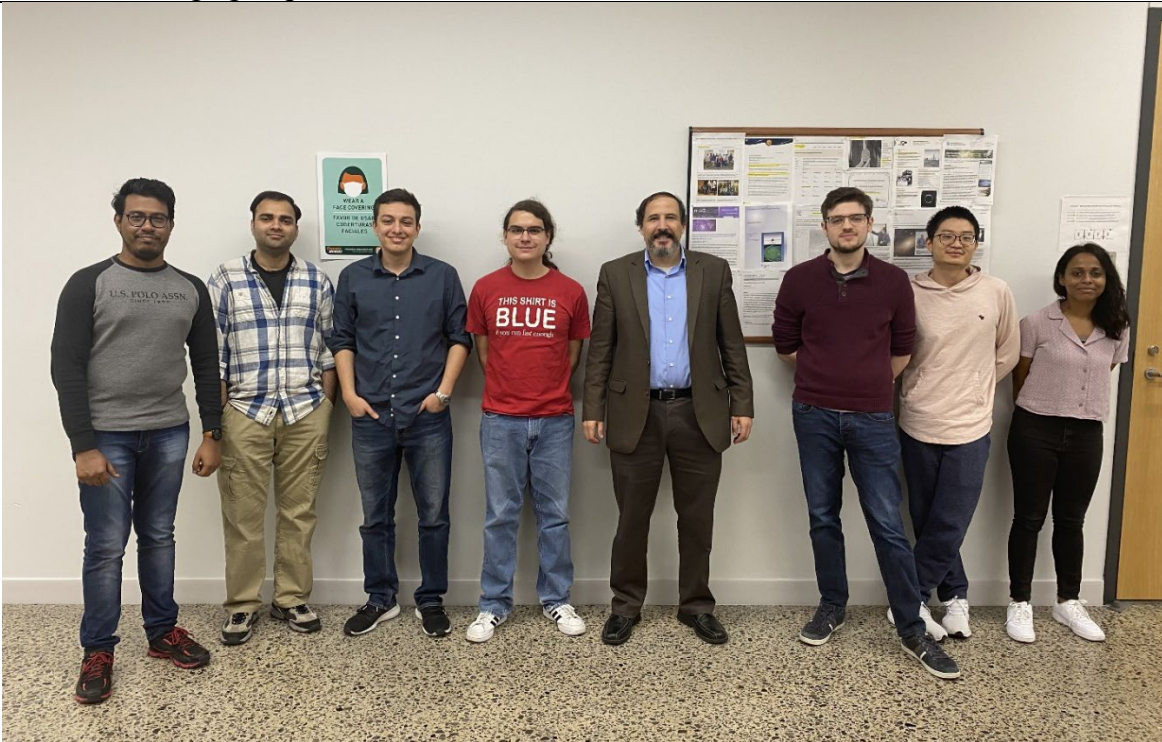
1. Tim Carlton summer 2006
2. Ray Whitside, summer 2007
3. Sid Mittal, summer 2008
4. Parker Maginley, summer 2008
5. Brandyn Lee, summer 2009
6. Scott Meesse, summer 2009
7. Genway Huang, summer 2010
8. Evan Remmele, summer 2011
9. Amelia Neild, summer 2018
10. Emily Bailey, summer 2018

Participation as member in the Ph.D. dissertation committee of:

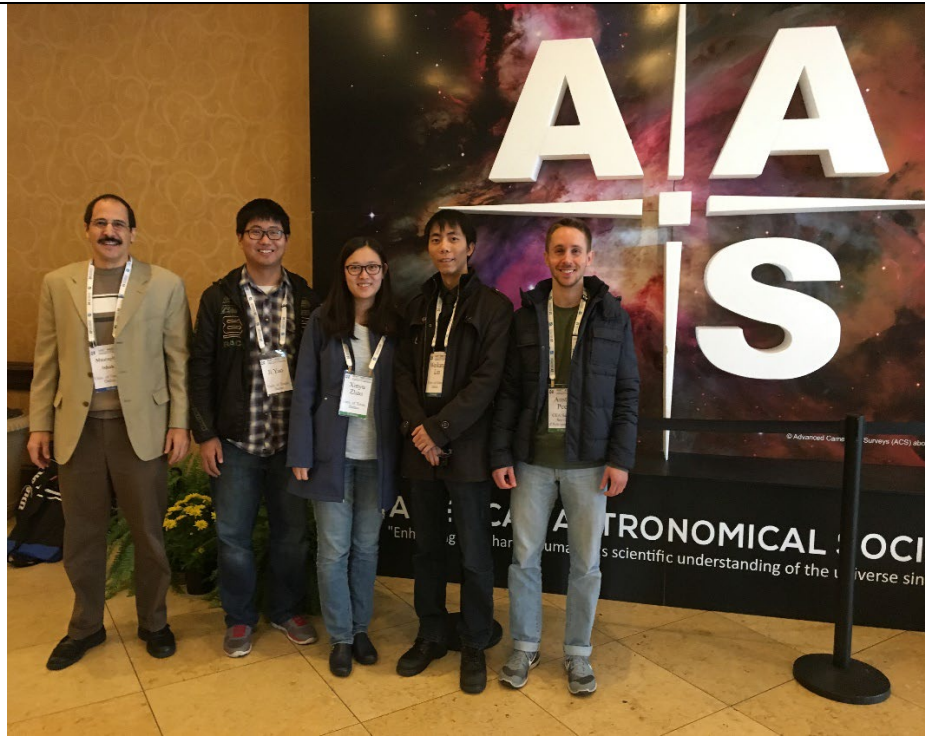
1. Wei-Cheng Wong, Physics department. Degree awarded in 2010.
2. Christina Torres, Physics Department. Degree awarded in 2008.
3. Harisankar Namasivayam, Physics Department, Degree awarded in 2015.
4. Mathew Titsworth, Physics and Math Departments. Degree awarded in 2016
5. Susmita Jyotishmati, Physics Department. Degree awarded in 2017
6. Robert Buckley, Physics Department, UT San Antonio. Degree awarded in 2015.
7. Joseph Coleman, Ph.D. Physics department. Degree awarded in 2018.
8. Brandyn Lee, Ph.D. Physics department. Degree awarded in 2018.
9. Peter Niedbalski, Ph.D. Physics department. Degree awarded in 2017.
10. Juan Servin, Ph.D. Physics department. Degree awarded in 2017.
11. Miyoung Choi, Ph.D. Physics department. Degree awarded in 2019.
12. Matthew Fong, Ph.D. Physics department. Degree awarded in 2019.
13. Xinyu Zhang, Ph.D. Physics department. Degree awarded in 2019.
14. Nathan Steinle, Ph.D. candidate, Physics Department.
15. Joseph Rossi, Ph.D. candidate, Physics Department.
16. Ruskin Patel, Ph.D. candidate, Physics Department.
17. Rahul Solanki, Ph.D. candidate, Physics Department.
18. Koustubh Bhattacharjee, Ph.D. candidate, Physics Department.
19. Seif Ali, Ph.D. candidate, Physics Department. Work in progress.
20. Sharon Felix, Ph.D. candidate, Physics Department. Work in progress.
21. Mahmud, Mohammad Murtaza, Ph.D. candidate, Physics Department. Work in progress.
22. Joshua Shussler, Ph.D. candidate, Physics Department. Work in progress.
23. Evangelos Stoikos, Ph.D. candidate, Physics Department. Work in progress.



Above: My research group in summer 2018 including graduate and undergraduate students. Back row from left to right, graduate students: Raul Solanki, Eske Pedersen, Matt Nelson, Leonel Medina, Weikang Lin, Anish Agash, Front row: Ishak-Boushaki, Logan Fox (graduate student), Emily Bailey (undergraduate student), Amelia Neild (undergraduate student). I also created a larger research group at UT-Dallas called the Cosmology, Astrophysics and Relativity Group by hiring faculty and that now counts 5 faculty and ~15-20 graduate students. I coordinate the activities of the large group.



My graduate students in May 2022. Left to right: Avijit Bera, Anish Agashe, Cristhian Garcia-Quintero, Leonel Medina-Varela, Mustapha Ishak, George Mitchel, Yunan Xie, Vinu Shamatka



Mustapha Ishak, graduate students Ji Yao, Xinyu Zhang, Weikang Lin, and researcher Austin Peel from Saclay (former PhD student). AAS meeting in Grapevine, TX, 2017



Ishak-Boushaki, graduate students Jason Dossett, Austin Peel and Michael Troxel at the 219th AAS Annual Meeting — Austin, TX, 2012

Teaching experience:[The University of Texas at Dallas](#)

Spring 2022 PHYS5395 Cosmology
 Fall 2021 PHYS2325 Mechanics
 Sum 2021 PHYS2325 Mechanics
 Spring 2021 PHYS5392 Relativity II - General Relativity
 Fall 2020 PHYS2325 Mechanics; Sum 2020 PHYS2325 Mechanics
 Spring 2020 PHYS5391 Relativity I – Special Relativity
 Fall 2019 PHYS2325 Mechanics
 Fall 2019 PHYS1100 Fun of Physics
 Sum 2019 PHYS2325 Mechanics
 Spring 2019 PHYS5395 Cosmology
 Fall 2018 PHYS2325 Mechanics; Sum 2018 PHYS2325 Mechanics
 Spring 2018 PHYS5392 Relativity II - General Relativity
 Fall 2017 PHYS2325 Mechanics
 Fall 2016 PHYS5311 Graduate Classical Mechanics
 Spring 2016 PHYS5391 Relativity I – Special Relativity
 Fall 2015 PHYS5311 Graduate Classical Mechanics
 Spring 2015 PHYS5395 Cosmology
 Fall 2014 PHYS5311 Graduate Classical Mechanics
 Spring 2014 PHYS5392 Relativity II – General Relativity
 Fall 2013 PHYS5311 Graduate Classical Mechanics
 Spring 2013 PHYS3312 Classical Mechanics
 Fall 2012 PHYS2325 Mechanics
 Spring 2012 PHYS2325 Mathematical Methods for Physics III
 Fall 2011 PHYS3312 Classical Mechanics
 Spring 2011 PHYS2325 Mechanics
 Fall 2010 PHYS2325 Mechanics; PHYS3312 Classical Mechanics
 Spring 2010 PHYS2325 Mechanics; PHYS5395 Cosmology
 Fall 2009 PHYS2325 Mechanics; PHYS3312 Classical Mechanics
 Spring 2009 PHYS2325-001 Mechanics; PHYS2325-002 Mechanics;
 Fall 2008 PHYS2325 Mechanics; PHYS2325 Classical Mechanics
 Spring 2008 PHYS2325 Mechanics; PHYS2325 Mechanics
 Fall 2007 PHYS3312 Classical Mechanics; PHYS5395 Cosmology
 Spring 2007 PHYS2325 Mechanics and Heat; PHYS2325 Mechanics and Heat
 Fall 2006 PHYS2325 Mechanics and Heat; PHYS3312 Classical Mechanics
 Spring 2006 PHYS2325 Mechanics and heat; PHYS5V49 Cosmology
 Fall 2005 PHYS2325 Mechanics and Heat,

[Princeton University](#)

Spring 2004 Preceptor for AST203 (lecturer appointment): The Universe
 Fall 2003 Preceptor for PHYS103 (lecturer appointment): General Physics

[Queen's University, Kingston, Ontario, Canada](#)

1998-2001 Teaching assistant and laboratory demonstrator for several physics courses including: PHY106, PHY107, PHY113, PHY414

[University of Quebec in Montreal, Canada](#)

1990-1992 Teaching assistant and demonstrator for several computer science courses including: INF1000, INF1090, INF3200, INF4200

Selected National and International Service contributions:

- Serving on the Committee on Astronomy and Astrophysics of the National Academies of Sciences
- Serving as Member of the American Physical Society Committee on Informing the Public
- Serving as Member of the LSST-DESC Equity, Diversity and Inclusion (EDI) Committee
- Serving as Member of the American Physical Society Inclusion, Diversity, and Equity Alliance (IDEA)
- Serves as Member of the Dark Energy Spectroscopic Instrument (DESI) Collaboration Meetings Committee
- Served as proposal reviewer in panel for the Department of Energy Cosmic Frontier program
- Chairman of the International Scientific Organizing Committee for the Texas Symposium on Relativistic Astrophysics (2013-2015)
- Served as proposal reviewer for the National Science Foundation, Astronomy and Astrophysics Grant program
- Served as proposal reviewer for the International Collaboration Program of the National Science Foundation
- Served as external reviewer for Full Faculty promotion file evaluation for University of New York in Abu Dhabi
- Served as proposal reviewer for NASA Astronomy and Astrophysics Postdoctoral Program
- Served as proposal reviewer for NASA ADA research program
- Served as proposal reviewer for Research Foundation of Canada/Quebec for Natural Sciences and Technology.
- Served as proposal reviewer for the National Commission for Scientific and Technological Research of Chile (CONICYT Chile).
- Reviewed a proposal for The Foundation for Polish Science.
- Reviewed proposal for the Netherlands Organization for Scientific Research (NWO)
- Reviewed Faculty promotion files for the University Faisalabad in Pakistan
- Served as proposal reviewer for the Texas Space Grant Consortium
- Served on the Editorial Board of Journal of Gravity. HPC publishing. New York.
- Served as Chair for the Cosmic Microwave Background session at the 2010 Annual conference of the American Astronomy Society in Washington DC.
- Served as Chair for the Dark Matter & Dark Energy session of the 2010 Annual conference of the American Astronomy Society in Washington DC.
- Served as Chair for the cosmology session of the 2012 Annual conference of the American Astronomy Society in Austin, TX.
- Chaired a session on cosmic acceleration at the second Texas Cosmology Network Meeting at the University of Texas at Austin.
- Serving as full member of the Large Synoptic Survey Telescope (LSST) DESC Science Collaboration.
- Served on the Scientific Organizing Committee of the 28th Texas Symposium on Relativistic Astrophysics in Geneva, Switzerland. 479 participants.
- Served as Chair for the cosmology session of the 2017 Annual conference of the American Astronomy Society in Grapevine, TX.

- Served on the Scientific Organizing Committee of 29th Texas Symposium on Relativistic Astrophysics in Cape Town, South Africa, December 2017.
- Served on the Scientific Organizing Committee of the 30th Texas Symposium on Relativistic Astrophysics in Portsmouth, UK, December 2019.
- Served as Convener/coordinator of the Theory and Joint Probes (TJP) working group of the Legacy Survey of Space and Time (LSST) Dark Energy Science Collaboration (DESC).
- Served as Member of the LSST-DESC Membership Committee

University Current and Previous Service Contributions:

- Academic Program Review Committee for 2018-2021
- New Student Engagement Board (NSEB) faculty advisory sub-committee (Co-Chair) (2018-present)
- Member of the University Faculty Mentoring Committee (2016-2018)
- Member of the University Academic Senate (2007-2016)
- Member of the University Sustainability Committee (2012-2015)
- Member of the Senate Advisory Committee on Research (2008-2010)
- Member of the NSM School PPE Committee (2014-present)
- Member of the Physics Graduate Admission Committee (2006-present)
- Member of the Physics Graduate Curriculum Committee (2015-present)
- Member of the Physics Department committee on undergraduate education (2005-2009)
- Member and Chair of the Ph.D. Physics qualifier exam (2006-2014)
- Advisor to the Society of Physics Students (2008-2010)
- Chair of the cosmology faculty search committee (2011,2013,2016)
- Member of space science faculty search committees (2009, 2010)
- Member of the physics faculty development committee (2010-present).
- Member and Chair of faculty third year review (2011, 2012)
- Member and Chair of faculty tenure review (2012, 2016)
- Outside Chair for Ph.D. Final Examinations (one per year)
- Chaired the local and international scientific organizing committees of the 27th Texas Symposium on Relativistic Astrophysics. (Jubilee meeting). The symposium received 470 participants, over 300 talks in 49 parallel sessions; 24 plenary and review talks, and a public lecture attended by over 1300 people.
- Organizing *Building Astronomy in Texas* (BAT) Symposium sponsored by the NSM School (Co-Chair of organizing Committee).
- Chaired the Provost Task Force on Teaching Large Introductory Classes commissioned by the Center for Teaching and Learning (university wide study).
- Served as Member of the University-Wide Committee for Search for a Dean for the Natural Sciences and Mathematics School

Journal Referee for:

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|---------------------------------|--|
| • Physical Review Letters | • Monthly Notices of Royal Astronomy Society |
| • Physical Review D | • General Relativity and Gravitation |
| • Astronomy & Astrophysics | • Euro-Physics Letters |
| • Classical and Quantum Gravity | • Physics Letters B. |

Articles published in refereed journals:

1. A. Elcio A. et al.
Cosmology intertwined: A review of the particle physics, astrophysics, and cosmology associated with the cosmological tensions and anomalies.
Published in: *JHEAp* 34 (2022) 49-211. Paper available at arXiv: [2203.06142](https://arxiv.org/abs/2203.06142)
2. Shadab Alam, Christian Arnold et al.
Towards testing the theory of gravity with DESI: summary statistics, model predictions and future simulation requirements
Published in *Journal of Cosmology and Astroparticle Physics* 11 (2021) 11, 050. Paper available at ArXiv: [2011.05771](https://arxiv.org/abs/2011.05771)
3. Cristhian Garcia-Quintero, Mustapha Ishak
Singling out modified gravity parameters and datasets reveals a new dichotomy between Planck and lensing. Published in *Monthly Notices of the Royal Astronomy Society* 506, 2. 1704 (2021). Paper available at [arXiv:2009.01189](https://arxiv.org/abs/2009.01189).
4. Abolfathi et al. for the LSST Dark Energy Science Collaboration.
The LSST DESC DC2 Simulated Sky Survey. Published in *Astrophysical Journal Supplement Series*, 253, 31 (2021). Paper available at [arXiv:2010.05926v3](https://arxiv.org/abs/2010.05926v3)
5. Nesar Ramachandra, Georgios Valogiannis, Mustapha Ishak, Katrin Heitmann
Matter Power Spectrum Emulator for f(R) Modified Gravity Cosmologies
Physical Review D 103, 123525 (2021). Preprint available at [arXiv:2010.00596](https://arxiv.org/abs/2010.00596).
6. Weikang Lin, Mustapha Ishak
A Bayesian interpretation of inconsistency measures in cosmology. *Journal of Cosmology and Astroparticle Physics* 2105, 009, (2021). Preprint available at [arXiv:1909.10991](https://arxiv.org/abs/1909.10991)
7. Cristhian Garcia-Quintero, Mustapha Ishak, Orion Ning
Current constraints on deviations from General Relativity using binning in redshift and scale. *Journal of Cosmology and Astroparticle Physics*, 12, 018 (2020). Paper available at arXiv:2010.12519
8. Eske M. Pedersen, Ji Yao, Mustapha Ishak, Pengjie Zhang
First detection of the GI-type of intrinsic alignments of galaxies using the self-calibration method in a photometric galaxy survey
Astrophysical Journal Letters 899 L5 (2020). arXiv:1911.01614
9. Ji Yao, Eske M. Pedersen, Mustapha Ishak, Pengjie Zhang, Anish Agashe, Haojie Xu, Huanyuan Shan.
Separating the Intrinsic Alignment Signal and the Lensing Signal using Self-Calibration in Photo-z Surveys with KiDS450 and KV450 Data
Monthly Notices of the Royal Astronomy Society 495 (2020) 3900. arXiv:1911.01582

10. Mustapha Ishak
Testing General Relativity at Cosmological Scales
Invited review article in *Living Reviews in Relativity* **22** (2019) 1-204. arXiv:1806.10122
11. Cristhian Garcia-Quintero, Mustapha Ishak, Logan Fox, Weikang Lin
Cosmological discordances III: more on measure properties, Large-Scale-Structure constraints, the Hubble constant and Planck
Physical Review D **100** (2019) 123538. arXiv:1910.01608.
12. Cristhian Garcia-Quintero, Mustapha Ishak, Logan Fox, Jason Dossett
ISiTGR: Testing deviations from GR at cosmological scales including dynamical dark energy, massive neutrinos, functional or binned parametrizations, and spatial curvature
Physical Review D **100** (2019) 103530. arXiv:1908.00290
13. Nora Elisa Chisari, David Alonso, Elisabeth Krause, C. Danielle Leonard, Philip Bull, J r my Neveu, Antonio Villarreal, Sukhdeep Singh, Thomas McClintock, John Ellison, Zilong Du, Joe Zuntz, Alexander Mead, Shahab Joudaki, Christiane S. Lorenz, Tilman Troester, Javier Sanchez, Francois Lanusse, **Mustapha Ishak**, Ren e Hlozek, Jonathan Blazek, Jean-Eric Campagne, Husni Almoubayyed, Tim Eifler, Matthew Kirby, David Kirkby, St phane Plaszczyński, Anze Slosar, Michal Vrástil, Erika L. Wagoner
Core Cosmology Library: Precision Cosmological Predictions for LSST.
Astrophysical Journal Supplement Series **241**, 1 (2019) 2-40. arXiv:1812.05995
14. Ji Yao, Mustapha Ishak, Michael Troxel.
Self-calibration method for II and GI types of intrinsic alignments
Monthly Notices of the Royal Astronomical Society, **483**, 1, 276 (2018).
15. Weikang Lin, Mustapha Ishak
Cosmological discordances: a new measure, marginalization effects, and application to geometry vs growth current data sets
Physical Review D **96**, 023532 (2017).
16. Weikang Lin, Mustapha Ishak
Cosmological discordances. II. Hubble constant, Planck and large-scale structure data sets,
Physical Review D **96**, 083532 (2017).
17. Ji Yao, Mustapha Ishak, Weikang Lin, M. A. Troxel
Effects of Self-Calibration of Intrinsic Alignment on Cosmological Parameter Constraints from Future Cosmic Shear Surveys
Journal of Cosmology and Astroparticle Physics **1710**, 056 (2017).
18. Weikang Lin, Mustapha Ishak
Testing gravity theories using tensor perturbations
Physical Review D **94**, 123011 (2016).
19. Tharake Wijenayake, Weikang Lin, Mustapha Ishak
Averaged universe confronted with cosmological observations: A fully covariant approach
Physical Review D **94**, 083501 (2016).

20. Weikang Lin, Mustapha Ishak
Ultra-faint dwarf galaxies: an arena for testing dark matter versus modified gravity
Journal of Cosmology and Astroparticle Physics 1610, 025 (2016).
21. Jason N. Dossett, Mustapha Ishak, David Parkinson, Tamara M. Davis. 2015
Constraints and tensions in testing general relativity from Planck and CFHTLenS including intrinsic alignment systematic.
Physical Review D 92, 023003 (2015)
22. M.A. Troxel, Mustapha Ishak. 2015
The Intrinsic Alignment of Galaxies and its Impact on Weak Gravitational Lensing in an Era of Precision Cosmology. (Invited Review Article).
Physics Reports 558, 1-59, (2015). doi:10.1016/j.physrep.2014.11.001.
23. Tharake Wijenayake, Mustapha Ishak. 2015
Expansion and Growth of Structure Observables in a Macroscopic Gravity Averaged Universe
Physical Review D 91, 063534, (2015)
24. M.A. Troxel, Mustapha Ishak. 2014.
“Cross-correlation between cosmic microwave background lensing and galaxy intrinsic alignment as a contaminant to gravitational lensing cross-correlated probes of the universe.”
Physical Review D 89: 063528 (2014).
25. Austin Peel, M. A. Troxel, Mustapha Ishak. 2014
Effect of inhomogeneities on high precision measurements of cosmological distances.
Physical Review D 90, (2014) 123536.
26. M.A. Troxel, Austin Peel, Mustapha Ishak. 2014.
“The effects of structure anisotropy on lensing observables in an exact general relativistic setting for precision cosmology.” *Journal of Cosmology and Astroparticle Physics* 1403: 040 (2014).
27. Mustapha Ishak, Austin Peel, M.A. Troxel. 2013.
“Stringent Restriction from the Growth of Large-Scale Structure on Apparent Acceleration in Inhomogeneous Cosmological Models.” *Physical Review Letters* 111: 251302 (2013).
28. Jason Dossett, Mustapha Ishak. 2013.
“Effects of Dark Energy Perturbations on Cosmological Tests of General Relativity.”
Physical Review D 88: 103008 (2013).
29. M.A. Troxel, Mustapha Ishak, 2013.
“Effects of anisotropy on gravitational infall in galaxy clusters using an exact general relativistic model.” *Journal of Cosmology and Astroparticle Physics* 12: 048 (2013).
30. Mustapha Ishak, Austin Peel. 2012.
“The growth of structure in the Szekeres inhomogeneous cosmological models and the matter-dominated era.” **Physical Review D** 85: 083502 (2012).

31. M. A. Troxel, Mustapha Ishak. 2012.
“Self-Calibration Technique for 3-point Intrinsic Alignment Correlations in Weak Lensing Surveys.” *Monthly Notices of the Royal Astronomy Society* 419: 1804 (2012).
32. Austin Peel, Mustapha Ishak, M. A. Troxel, 2012
“Large-scale growth evolution in the Szekeres inhomogeneous cosmological models with comparison to growth data.” *Physical Review D* 86: 123508 (2012).
33. Jason Dossett, Mustapha Ishak. 2012.
“Spatial curvature and cosmological tests of general relativity.”
Physical Review D 86: 103008 (2012).
34. M. A. Troxel, Mustapha Ishak. 2012.
“Self-calibrating the gravitational shear-intrinsic ellipticity-intrinsic ellipticity (GII) cross-correlation.” *Monthly Notices of the Royal Astronomy Society* 427: 442 (2012).
35. M. A. Troxel, Mustapha Ishak. 2012
“Self-Calibration for 3-point Intrinsic Alignment Auto-Correlations in Weak Lensing Surveys.” *Monthly Notices of the Royal Astronomy Society* 423: 1663 (2012).
36. Jason Dossett, Mustapha Ishak, Jacob Moldenhauer. 2011
“Testing General Relativity at Cosmological Scales: Implementation and Parameter Correlations.” *Physical Review D* 84: 123001 (2011).
37. Jason Dossett, Jacob Moldenhauer, Mustapha Ishak. 2011
“Figures of merit and constraints from testing General Relativity using the latest cosmological data sets including refined COSMOS 3D weak lensing.” *Physical Review D* 84, 023012, (2011).
38. Anthony Nwankwo, Mustapha Ishak, John Thompson. 2011.
“Luminosity distance and redshift in the Szekeres inhomogeneous cosmological models.”
Journal of Cosmology and Astroparticle Physics 1105:028 (2011).
39. Moldenhauer, Jacob; Ishak, Mustapha; Thompson, John; Easson, Damien. 2011.
“Supernova, baryon acoustic oscillations, and CMB surface distance constraints on $f(G)$ higher order gravity models.” *Physical Review D* 81: 063514 (2011).
40. Ishak, Mustapha; Rindler, Wolfgang. 2010.
“The relevance of the Cosmological Constant for Gravitational Lensing.” *General Relativity and Gravitation*. Volume 42, Number 9, 2247-2268.
41. Dossett, Jason; Ishak, Mustapha; Gong, Yungui; Wang, Anzhong. 2010.
“Constraints on growth index parameters from current and future observations.” *Journal of Cosmology and Particle Astrophysics* 1004: 022 (2010).

42. Ishak, Mustapha; Rindler, Wolfgang; Dossett, Jason. 2010.
“More on lensing by a cosmological constant.” *Monthly Notices of the Royal Astronomical Society* 403: 2152-2156 (2010).
43. Moldenhauer, Jacob; Ishak, Mustapha. 2009.
“A minimal set of invariants as a systematic approach to higher order gravity models: Physical and Cosmological Constraints.” *Journal of Cosmology and Particle Astrophysics* 0912:020 (2009).
44. Ishak, Mustapha; Dossett, Jason. 2009.
“Contiguous redshift parameterizations of the growth index.” *Physical Review D* 80: 043004 (2009).
45. Gong, Yungui; Ishak, Mustapha; Wang, Anzhong. 2009.
“Growth factor parameterization in curved space.” *Physical Review D* 80: 023002 (2009).
46. Ishak, Mustapha; Moldenhauer, Jacob. 2009.
“A minimal set of invariants as a systematic approach to higher order gravity models I.” *Journal of Cosmology and Astroparticle Physics* 0901: 024 (2009).
47. Ishak, Mustapha; Richardson, James; Garred David; Whittington Delilah; Nwankwo Anthony, Sussman Roberto. 2008.
“Dark Energy or Apparent Acceleration Due to a Relativistic Cosmological Model More Complex than FLRW?” *Physical Review D* 78: 123531 (2008).
48. Ishak, Mustapha. 2008.
“Light Deflection, Lensing, and Time Delays from Gravitational Potentials and Fermat's Principle in the Presence of a Cosmological Constant”. *Physical Review D* 78: 103006 (2008).
49. Ishak, Mustapha; Rindler, Wolfgang; Dossett Jason; Moldenhauer, Jacob; Allison Chris. 2008.
“A new independent limit on the cosmological constant/dark energy from the relativistic bending of light by Galaxies and clusters of Galaxies.” *Monthly Notices of the Royal Astronomical Society* 388: 1279 (2008).
50. Richardson James; Ishak, Mustapha. 2008.
Inverse approach to Einstein's equations for fluids with vanishing anisotropic stress tensor. *Physical Review D* 77: 044005 (2008).
51. Ishak, Mustapha. 2007.
“Remarks on the formulation of the cosmological constant/dark energy questions.” *Foundation of Physics Journal* 37:1470-1498 (2007).
52. Hirata, Christopher; Mandelbaum, Rachel; Ishak, Mustapha; Seljak, Uros; Nichol, Robert; Pimblet Kevin; Ross Nicholas; Wake David. 2007.
“Intrinsic galaxy alignments from the 2SLAQ and SDSS surveys: luminosity and redshift

- scalings and implications for weak lensing surveys.” *Monthly Notices of the Royal Astronomical Society*, 381, 1197-1218 (2007).
53. Rindler, Wolfgang; Ishak, Mustapha. 2007.
The Contribution of the Cosmological Constant to the Relativistic Bending of Light Revisited. *Physical Review D* 76: 043006.
54. Ishak, Mustapha; Upadhye, Amol; Spergel, David. 2006.
“Probing Cosmic Acceleration Beyond the Equation of State: Distinguishing between Dark Energy and Modified Gravity Models”. *Physical Review D* 74: 043513 (2006).
55. Mandelbaum, Rachel; Hirata, Christopher; Ishak, Mustapha; Seljak, Uros; Brinkmann, Jonathan. 2006.
“Detection of large scale intrinsic ellipticity-density correlation from the Sloan Digital Sky Survey and implications for weak lensing surveys.” *Monthly Notices of the Royal Astronomy Society* 367: 611-626 (2006).
56. Ishak, Mustapha. 2005.
“Probing decisive answers to dark energy questions from cosmic complementarity and lensing tomography.” *Monthly Notices of the Royal Astronomical Society* 363: 469-478 (2005).
57. Ishak, Mustapha; Hirata Christopher. 2005.
“Spectroscopic source redshifts and parameter constraints from weak lensing and CMB.” *Physical Review D* 71: 023002 (2005).
58. Upadhye, Amol; Ishak, Mustapha; Steinhardt Paul. 2005.
“Dynamical dark energy: Current constraints and forecast.” *Physical Review D* 72: 063501 (2005).
59. Ishak, Mustapha. 2004.
“On Perfect Fluid Models In Non-Comoving Null (Observational) Spherical Coordinate.” *Physical Review D* 69: 124027 (2004).
60. Ishak, Mustapha; Hirata Christopher; McDonald, Patrick; Seljak, Uros. 2003.
“Weak Lensing and CMB: Parameter forecasts including a running spectral index.” *Physical Review D* 69:08314 (2004).
61. Ishak, Mustapha; Lake, Kayll. 2003.
“An Inverse Approach to Einstein's Equations for non-conducting fluids.” *Physical Review D* 68: 104031 (2003).
62. Ishak, Mustapha; Sussman, Roberto. 2002.
“Adiabatic Models of the Cosmological Radiative Era.” *General Relativity and Gravitation* 34, No. 10: 1589-1616.

63. Ishak, Mustapha; Lake, Kayll. 2002.
“Stability of Transparent Spherically Symmetric Thin Shells and Wormholes.”
Physical Review D 65: 044011 (2002).
64. Ishak, Mustapha; Lake, Kayll. 2002.
“Interactive Geometric Database, Including Exact Solutions of Einstein's Field Equations.”
Classical and Quantum Gravity 19: 505-514 (2002).
65. Neary, Nicholas; Ishak, Mustapha; Lake, Kayll. 2001.
“The Tolman VII solution, trapped null orbits and w-modes.” *Physical Review D* 64:
028001 (2001).
66. Ishak, Mustapha; Chamandy, Luke; Neary, Nicholas; Lake, Kayll. 2001.
“Exact solutions with w-modes.” *Physical Review D* 64: 024005 (2001).

Other refereed publications:

1. “Modified Gravity and Dark Energy models Beyond $w(z)$ CDM Testable by LSST”
Mustapha Ishak, Tessa Baker, Philip Bull, Eske M. Pedersen, Jonathan Blazek, Pedro G. Ferreira, C. Danielle Leonard, Weikang Lin, Eric Linder, Kris Pardo, Georgios Valogiannis.
Refereed Internal Publication for the Large Space and Time Telescope -- Dark Energy Science Collaboration. May (2019). 61 pages.
Manuscript made publicly available at arXiv:1905.09687

Articles published in proceedings volumes:

1. Ishak, Mustapha; Richardson, James; Garred David; Whittington Delilah; Nwankwo Anthony; Sussman Roberto. 2010.
Apparent Acceleration Due to Relativistic Cosmological Models More Complex than FLRW as a Possible Alternative to Dark Energy. *Proceedings of the 12th Marcel Grossmann Meeting on General Relativity*, eds. T.Damour, R.Jantzen and R. Ruffini, World Scientific, Singapore, 2010.
2. Ishak, Mustapha. Competing explanations for cosmic acceleration or why is the expansion of the universe is accelerating?
AIP Conference Proceedings of the 8th International Conference on Progress in Theoretical Physics. Volume 1444, pp. 66-76 (2012). (c) 2012: American Institute of Physics.
3. Ishak, Mustapha. 2010
A brief discussion of cosmic acceleration and dark energy problems. *African skies* 14: 9-12 (2010). *Proceedings of the Auresian Workshop on Astronomy and Astrophysics*, Batna, Edited by Peter Martinez, 2010.

4. Ishak, Mustapha; Chamandy, Luke; Lake, Kayll. 2000.
Exact Solutions with w-modes: Scattering of gravitational waves By neutron stars.
Proceedings of the 20th Texas Symposium on Relativistic Astrophysics, American Institute of Physics. Editors J.C.Wheeler and H. Martel, 2000.
5. Sussman, Roberto; Ishak, Mustapha. Inhomogeneous Cosmologies with Adiabatic Evolution. *Proceedings of Developments in Mathematical and Experimental Physics, Volume A: Cosmology and Gravitation*. Edited by A. Macias, F. Uribe and E. Diaz. Published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002, p.285.
6. Ishak, Mustapha; Musgrave, Peter; Mourra, John; Stern, Jonathan; Lake, kayll. 1999.
GRLite and GRTensorJ: Graphical User Interfaces to the Computer Algebra System GRTensorII, *Proceedings of the Eight Canadian Conference on General Relativity and Relativistic Astrophysics*, American Institute of Physics. Editors C.P.Burgess and R.C.Myers, 1999.

Selected invited and plenary talks:

1. "Possible Causes of Cosmic Acceleration." Invited talk at the School of Arts, Technology, and Emerging Communication (ATEC) at UT-Dallas, (Spring, 2022)
2. "DESC LSS Analysis Software Pipeline Overview." Invited talk at the 2021 meeting of the Dark Energy Spectroscopic Instrument. Remotely (December, 2021).
3. Is Cosmic Acceleration a Symptom of the breakdown of General Relativity. Presented at the Spergelfest Event held at Princeton University. Remotely (October, 2021).
4. "Self-Calibration of Intrinsic Alignments of Galaxies." Invited talk at the C3 Mock Challenge working group of the DESI collaboration. Remotely (February, 2021)
5. "Testing General Relativity in Cosmology "
Invited plenary talk at the 2020 Latin American Workshop on Observational Cosmology. International Center for Theoretical Physics and South American Institute for Fundamental Research (December, 2020)
6. Scale-Dependent mu-Sigma Modified Gravity Parameterization capabilities in Core Cosmology Library"
Invited talk at the Legacy Survey for Space and Time Telescope (LSST-DESC) annual meeting (July, 2020)
7. "Recitation and Problem Solving Sections for Large Classes"
Selected talk at the Annual Workshop of the Center for Teaching and Learning (March, 2020)
8. "The Acceleration of the Cosmos and Tests of Gravity at Large-Scales in the Universe"
Colloquium presented at Kansas State University,

Manhattan, Kansas (December, 2019)

9. “The Acceleration of the Cosmos and Test of General Relativity at Large Scales in the Universe.”
Invited Plenary Opening talk at the International Conference to celebrate the Centenary Anniversary of the famous 1919 Eclipse experiment that confirmed General Relativity of Einstein. Sobral, Brazil (May, 2019).
10. “Testing Modifications to Gravity (MG) and Cosmic Acceleration using LSST”
Invited talk presented at the LSST workshop at Texas A&M University, College Station, Texas (November, 2019)
11. “Dark Energy & The Accelerating Universe”
Colloquium presented at LeTourneau University, Longview, Texas (March, 2019).
12. “Why is the expansion of the universe accelerating?”
Colloquium presented at Baylor University, Waco, Texas (October, 2018).
13. “Some Open Problems in Physical Cosmology”
Invited lecture at the Center for Values in Medicine, Science and Technology, UT-Dallas, Texas (October, 2018).
14. “A cosmic conundrum: inconsistency tests between cosmological data sets”
Invited presentation for press briefing at the 232nd Annual Conference of the American Astronomical Society, Denver, Colorado (June 2018).
15. “Cosmology for future generations”
Invited presentation at the Back to Space Day, UT-Dallas, Texas (October, 2018).
16. Why is the expansion of the universe accelerating?
Public Lecture at the Perot Museum of Sciences in Dallas, Dallas, Texas (October, 2017).
17. Why is the expansion of the universe accelerating?
Colloquium presented at University of Texas at Arlington, Arlington, Texas (September, 2017).
18. Cosmological consistency tests of gravity theory and cosmic acceleration.
Testing Gravity Meeting 2017 at Simon Frazer University Vancouver, British Columbia (January, 2017)
19. Why is the expansion of the universe accelerating?
Colloquium presented at Baylor University, Waco, Texas (September, 2016).

20. Why is the expansion of the universe accelerating?
Colloquium presented at the monthly meeting of the Texas Astronomical Society, UT-Dallas Campus (October, 2016).
21. *Exact Solutions to Einstein's Equations in Astrophysics.*
Invited plenary talk presented at 28th Texas Symposium on Relativistic Astrophysics in Geneva, Switzerland (December 2015).
22. *Why is the expansion of the universe accelerating?*
Colloquium presented at the University of Dallas, Irving, Texas (November, 2015).
23. *Why is the expansion of the universe accelerating?*
Colloquium presented at the Texas Christian University, Fort Worth, Texas (November 2015).
24. *Cosmology and Astrophysics at UT-Dallas.*
Invited presentation at *Building Astronomy in Texas Meeting* at Texas A&M, College Station, Texas (September 2015).
25. *Two Big Puzzles in Modern Cosmology: Dark Energy and Dark Matter*
Invited Public Lecture at the Physics Symposium: *Through a Cosmos Darkly* at the South Methodist University, Dallas (April, 2015).
26. *Current Constraints on Dark Energy and Modified gravity*
Invited plenary talk presented at the international meeting on Testing Gravity 2015, Vancouver, Canada (January, 2015).
27. Why is the expansion of the universe accelerating?
Colloquium presented at the University of North Texas. Denton, TX, (October, 2014).
28. Testing Gravity at Cosmological Scales .
Selected talk presented at the Dark Energy Science Collaboration LSST meeting. University of Pennsylvania, PA (June, 2014).
29. Invited talk presented to the Society of Physics Students, UT-Dallas, TX. (October, 2014)
Open Questions in Cosmology.
30. Presentation plus reception of the Robert S. Hyer Award for excellence in research at the Joint Fall 2013 Meeting of the Texas Section of the American Physical Society. "Recent Progress on Testing General Relativity at Cosmological Scales and Implications for Cosmic Acceleration". (Brownsville, TX, October 2013).
31. Selected talk at the Cosmo2013 Cosmology Conference.
"Testing General Relativity at Cosmological Scales".
(Cambridge, UK, 2013).

32. Invited presentation at the yearly client appreciation event by Cadent Capital. “Our expanding universe: why is the expansion of the universe accelerating?” (Richardson, TX, 2013).
33. Colloquium at the Texas A&M at Commerce, “Why is the expansion of the universe accelerating?” (T&M Commerce, TX, 2013)
34. Colloquium at the University of Texas at San Antonio, “Why is the expansion of the universe accelerating?” (UTSA San Antonio, TX, 2012)
35. Colloquium at the University of Texas at Dallas, “Why is the universe expansion accelerating?” (UTD Richardson, TX, 2012)
36. Invited Presentation at the NSM Advisory Council meeting, ‘The UTD Cosmology Research Efforts in Understanding the Problems of Dark matter and Dark Energy.’ (Richardson, 2012)
37. Colloquium at the University of Texas at San Antonio, “Why is the expansion of the universe accelerating?” (UTSA San Antonio, TX, 2012)
38. Colloquium at the University of Texas at Dallas, “Why is the universe expansion accelerating?” (UTD, TX, 2012)
39. Invited Presentation at the NSM Advisory Council meeting, ‘The UTD Cosmology Research Efforts in Understanding the Problems of Dark matter and Dark Energy.’ (Dallas, Nov. 2012)
40. Colloquium at Baylor University, “Why is cosmic expansion accelerating?” (Baylor, TX, 2011)
41. Invited plenary talk On Cosmic Acceleration at the Joint Fall 2011 Meeting of the Texas Sections of the APS, AAPT, and Zone 13 of the SPS, Volume 56, Number 7, (Commerce, TX, 2011)
42. Colloquium at University of Oklahoma, “Why is cosmic expansion accelerating?” (Norman, OK, 2011)
43. Invited plenary talk on Cosmic Acceleration at the 8th International Conference on Theoretical Physics at University of Constantine, (Constantine, 2011).
44. Invited parallel talk on Inhomogeneous models and Cosmic Acceleration at the 8th International Conference on Theoretical Physics at University of Constantine, (Constantine, 2011).
45. Colloquium at the Louisiana State University, Baton Rouge, LO, 2010.
Why is the expansion of the universe accelerating?

46. Colloquium at the University of New Mexico at Socorro, NM, 2010.
Why is the expansion of the universe accelerating?
47. Colloquium at the University of Texas at Brownsville, Brownsville, TX, 2010.
Why is the expansion of the universe accelerating? One of the biggest puzzles in cosmology!
48. Public Lecture to the Texas Astronomy Society, University of Texas at Dallas, Richardson, TX, 2010.
Why is the expansion of the universe accelerating?
49. Colloquium at the University of Texas at Arlington, Arlington, TX, 2010.
Why is the expansion of the universe accelerating? One of the biggest puzzles in cosmology!
50. The Invisible Universe – Dark Matter and Dark Energy
Talk given at the STEM Saturday event at UT Dallas, Fall 2010.
51. What is it to be an Astrophysics Professor at a University?
Series of talks given at Career Day at SMS Middle School in Plano Independent School District, Fall 2010.
52. Refereed talk at the 12th Marcel Grossmann Meeting on General Relativity and Gravitation, UNESCO, Paris, 2009.
Apparent Acceleration Due to Relativistic Cosmological Models More Complex than FLRW as a Possible Alternative to Dark Energy.
53. Invited talk at the Texas Cosmology Network Meeting, University of Texas at Austin, Austin, TX, 2009.
The growth rate index of large scale structure as a probe of cosmic acceleration.
54. Colloquium at Baylor University, Baylor, 2009.
Dark Energy or Apparent Acceleration Due to a Relativistic Cosmological Model More Complex than FLRW?
55. “*The Invisible Universe – Dark Matter and Dark Energy*”, talk given at the STEM Saturday event at UT Dallas (Dallas, 2009).
56. Invited review talk at the Auresian Workshop on Astronomy and Astrophysics, Batna, Algeria, 2008. Cosmic Acceleration: A Review.
57. Colloquium at the University Mentouri, Constantine, Algeria, 2008.
Modern Cosmology: Current status and news challenges.
58. Selected presentation at the Origin of Dark Energy Conference, Waterloo, ON, 2007.
Dark Energy versus Modified Gravity Models: Probing Cosmic Acceleration Beyond the Equation of State.

59. Colloquium given at NASA Goddard Space Flight Center, Baltimore, MA, 2006.
Cosmic acceleration: Dark Energy or Modified gravity?
60. Colloquium given at the Southern Methodist University, Dallas, TX, 2006.
Cosmic Acceleration: A Dark Energy Component or a Signature of Modified Gravity at Cosmological Scales?
61. Invited talk at the 1st Texas Cosmology Network Meeting at the University of Texas at Austin, Austin, TX, 2006.
Gravitational Weak Lensing and Cosmic Acceleration
62. Seminar given at the Johns Hopkins University, Baltimore, MD, 2005.
Current and future constraints on Dark Energy parameters,
63. Colloquium given at Austin College, Sherman, TX, 2005.
Recent progress in cosmology and the cosmic acceleration problem.
64. Selected talk at the 3rd Oxford-Princeton Workshop on Cosmology, Princeton, NJ, 2005.
Probing decisive answers to dark energy questions from cosmic complementarity and lensing tomography.
65. Colloquium given at the University of Texas at Dallas, Richardson, TX, 2005.
Dark Energy Questions and Cosmological Probe.
66. Selected talk at the Workshop on Gravitational Lensing, Dark Energy, and Dark Matter at the Ohio Center for Theoretical Science, the Ohio State University, Columbus, OH, 2005.
Dynamical Dark Energy: Current and future constraints from cosmic complementarity and weak lensing tomography.
67. Seminar given at the Gravitational Lensing Workshop at the Institute for Advanced Studies, Princeton-IAS, NJ, (2004). Model-dependent and independent constraints on dark energy from weak lensing (cosmic shear) tomography.
68. Seminar given at the Princeton University & Institute for Advanced Studies joint Gravitational Lensing Seminar. Princeton, NJ, (2004).
Future constraints on Dark Energy from complementary observations and weak lensing
69. tomography (a critical discussion).
70. Seminar given at the Gravity Group at Princeton University, Princeton, NJ, (2003).
Inverse Problems In General Relativity and the Cosmic Acceleration.
71. Invited talk given at the 13th Kingston Theoretical Astrophysics Meeting, University of British Columbia, Vancouver, BC, (2003). Weak Lensing and CMB: Cosmological parameter forecasts including a running spectral index.
72. Seminar given at the Canadian Institute for Theoretical Astrophysics, Toronto, ON, (2002).
GRDB and applications to astrophysics and cosmology.

73. Seminar given at the joint astrophysics seminars of University of Montreal and McGill University, Montreal, QC, (2002). An inverse approach to Einstein Field Equations: fitting cosmological model.

Selected Contributed presentations at professional meetings and professional workshops attended:

1. “Testing deviations from general relativity at cosmological scales reveals a new dichotomy between Planck and Lensing data.” Contributed talk to the annual meeting of the American Physical Society, New York (April, 2022).
2. “Injecting intrinsic alignments in mock catalogs and simulations.” Contributed talk at the annual meeting of the LSST-DESC collaboration. Remotely (February 2021)
3. “Intrinsic Alignment Self-Calibration.” Contributed talk at the annual meeting of the LSST-DESC collaboration. Remotely (July 2021)
4. “Testing deviations from general relativity at cosmological scales reveals a new dichotomy between Planck and Lensing data.” Contributed talk to the annual meeting of the American Astronomy Society. Remotely (January, 2021).
5. “TJP session: Beyond Λ CDM model project update summary”
Talk given at the Legacy Survey of Space and Time – Dark Energy Science Collaboration (LSST-DESC) University of Arizona (January, 2020).
6. “Overview of Astronomy Research at UT-Dallas”
Talk given at the 3rd Symposium on Building Astronomy in Texas, UT-Dallas (January, 2019)
7. “TJP session: Beyond Λ CDM model project update summary”
Talk given at the Legacy Survey of Space and Time – Dark Energy Science Collaboration (LSST-DESC) winter annual meeting at Berkeley University, California (February, 2019).
8. “Modified Gravity and Dark Energy models Beyond Λ CDM Testable by LSST”
Summary talk given at the Legacy Survey of Space and Time – Dark Energy Science Collaboration (LSST-DESC) winter annual meeting at Berkeley University, California (February, 2019).
9. “Core Cosmology Library (CCL) overview and new updates”
Talk given at the Legacy Survey of Space and Time – Dark Energy Science Collaboration (LSST-DESC) summer annual meeting at Diderot University in Paris (July, 2019).
10. “Probing gravity theory and cosmic acceleration using (in)consistency tests between cosmological data sets.” Poster presented at Cosmic Controversies Symposium at University of Chicago (October, 2019)

11. “Probing gravity theory and cosmic acceleration using (in)consistency tests between cosmological data sets.” Poster presented at Texas Advanced Computing Symposium, UT Austin, TX (September, 2019)
12. LSST-Dark Energy Science Annual Collaboration meeting at SLAC National Accelerator Laboratory – Stanford University (Mento Park, CA, February 2018).
“Opening talk for work session on Beyond Λ CDM models Testable by LSST Analysis.”
13. 232nd Annual Conference of the American Astronomical Society, Denver, Colorado (June 2018).
Contributed talk: “Probing gravity theory and cosmic acceleration using (in)consistency tests between cosmological data sets”
14. Joint Fall 2017 Meeting of the Texas Section of the APS, Texas Section of the AAPT, and Zone 13 of the Society of Physics Students (Dallas, TX, 2017)
Seeking insights on gravity theory and cosmic acceleration from consistency tests between cosmological data sets
15. 229th Annual Meeting of the American Astronomical Society (Grapevine, TX, 2017)
Cosmological consistency tests of gravity theory and cosmic acceleration.
16. LSST-Dark Energy Science Annual Collaboration meeting at SLAC National Accelerator Laboratory – Stanford University (Mento Park, CA, 2017).
Gave introductory talk and chaired two sessions on: Testing modified gravity models: selection criteria for models to be tested by LSST.
17. LSST-Dark Energy Science Annual Collaboration meeting at SLAC National Accelerator Laboratory – Stanford University (Mento Park, CA, 2017).
“Summary talk on working session on Beyond Λ CDM models Testable by LSST Analysis.”
18. 228th Annual Meeting of the American Astronomical Society (San Diego, CA, 2016)
Constraints from Cosmological Data on Expansion and Growth of Structure Observables in a Macroscopic Gravity Averaged Universe.
19. LSST-Dark Energy Science Annual Collaboration meeting at SLAC National Accelerator Laboratory – Stanford University (Mento Park, CA, 2016).
Co-organized session-1 of the Theory and Joint Probes (TJP) working group: Theory beyond Λ CDM and CX5 (Mitigating Systematics)
20. LSST-Dark Energy Science Collaboration Hack-Week Workshop at Carnegie Mellon University (Pittsburgh, PA, 2016).
Worked on Self-Calibration of Intrinsic Alignment of Galaxies.
Gave a talk on classification of Modified Gravity Models and Testing them using LSST.
21. LSST-Dark Energy Science Collaboration meeting at Argonne National Laboratory (Lemont, IL, 2015).
Presentation-1: Interacting models of Dark Energy and Dark Matter
Presentation-2: Self-Calibration of Intrinsic Alignments of Galaxies

22. Special Meeting of the Theory and Joint Probes (TJP) Working Group of the LSST-Dark Energy Science Collaboration, April 2015. Presentation: Constraints and tensions on MG parameters from Planck, CFHTLenS and other data sets including intrinsic alignment systematic.
23. LSST-Dark Energy Science Annual Collaboration meeting at SLAC National Accelerator Laboratory – Stanford University (Mento Park, CA, 2015).
Short Presentation + discussion about combining cosmological probe constraints and covariances (on behalf of the Theory-Joint-Probes working group).
24. LSST-Dark Energy Science Annual Collaboration meeting at University of Pennsylvania (Philadelphia, PA, 2014).
Theory-Joint-Probes and Weak-Lensing working group session talk.
25. Conference of the American Astronomical Society, AAS Meeting #219, Austin, TX, 2012.
New Results from Using Inhomogeneous Cosmological Models in an Era of Precision Cosmology Observations.
26. Conference of the American Astronomical Society, AAS Meeting #215, Washington DC, 2010. On The Growth Rate Index Parameter and Cosmic Acceleration.
27. Conference for the Advancement of Science Teaching. Colleyville, Texas. 2010.
Cosmology and Our Universe: Why Dark Energy and is it Real?
28. Sixteenth Annual Meeting of the Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching. Austin. 2010.
Cosmology and Our Universe: Why Dark Energy, and is it Real?
29. Conference of the American Astronomical Society, AAS Meeting #212, St-Louis, MI, 2008.
The Contribution of The Cosmological Constant/Dark Energy to The Bending of Light Revisited: Applications to Gravitational Lensing, Time Delays and an Upper-bound on The Cosmological Constant.
30. Conference of the American Astronomical Society, Meeting #211, Austin, TX, 2008.
Dark Energy or Apparent Acceleration Due to a Relativistic Cosmological Model More Complex than FLRW?
31. Joint Fall Meeting of the Texas and Four Corners Sections of APS, AAPT, SPS, and the Societies of Hispanic & Black Physicists, EL-Paso, TX, 2008.
The Contribution of the Cosmological Constant/Dark Energy to The Bending of Light and its Applications.
32. AAS/AAPT Joint Meeting, of the American Astronomical Society, Meeting #209, Bulletin of the American Astronomical Society. Seattle, WA, 2007.
Dark Energy versus Modified Gravity Models: Probing Cosmic Acceleration Beyond the Equation of State.

33. Seminar at the University of Texas at Dallas, Richardson, TX, 2006.
A new procedure to distinguish between dark energy models and modified gravity models.
Growth versus expansion.
34. April meeting of the American Physical Society, abstract # I7.002, Dallas, 2006.
A new procedure to distinguish between dark energy models and modified gravity models,
35. American Astronomical Society Meeting 208, #62.01, Vancouver, 2006.
Detection Of Large Scale Intrinsic Ellipticity-Density Correlation From The Sloan Digital Sky Survey And Implications For Weak Lensing Surveys.
36. American Astronomical Society Meeting 207, #126.03; Washington, DC, 2006.
A new procedure to distinguish between dark energy models and modified gravity models.
37. Canadian Astronomical Society meeting at the University of Montreal, Montreal, QC, 2005.
Testing if cosmic acceleration is due to Dark Energy or if it is a symptom of the breakdown of General Relativity on cosmological scale.
38. The International Workshop on Particle Physics and the Early Universe (COSMO-2004), organized by the Canadian Institute for Theoretical Astrophysics. Toronto, ON, 2004.
How and when are we going to constrain dark energy parameters to a satisfactory level of precision?
39. Annual Meeting of the Canadian Astronomical Society, University of Waterloo, Ontario, 2003.
Dark Matter and a Possible Solution for the Acceleration Problems.
40. Tenth Canadian Conference on General Relativity and Relativistic Astrophysics, University of Guelph, Ontario, 2003.
From Inverse Problems in General Relativity to a Possible Solution to the Cosmic Acceleration Problems.
41. Annual Congress of the Canadian Association of Physicists, University of Quebec, QC, 2002.
Perfect Fluid Cosmologies in Null (Observational) Coordinates.
42. Annual Meeting of the Canadian Astronomical Society (McMaster University, 2001, Hamilton, Ontario).
A fitting Approach to Cosmology Using Null (Observational) Coordinates.
43. Seminar at University Autonoma de Mexico, Gravity Group, Mexico, 2000.
A fitting Approach to Cosmology.
44. The 20th Texas Symposium on relativistic Astrophysics, Austin, 2000.
Exact Solutions with w-modes: Scattering of Gravitational Waves by Neutron Stars.