

Arif Babul
Distinguished University Professor
Director, Canadian Computational Cosmology Collaboration (C4)

CONTACT INFORMATION

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RESEARCH INTERESTS - PUBLIC STATEMENT

Observations inform us that our physical Universe emerged from the Big Bang in an exceedingly smooth and homogenous state. And yet, gazing out at the Cosmos today, we see a highly structured Universe in which matter is spun into rich web-like chains of galaxies, occasionally punctuated by massive dynamic swarms (“clusters”) of up to a thousand bright galaxies held together by their mutual gravity, all woven around giant empty voids millions of light-years across. Explaining the transition from one state to another, and understanding the chain of physical processes that endow the cosmic structures with their observed properties forms the basis of my research. The process of cosmic structure formation can, in broad strokes, be summarized as follows: The cosmic distribution of matter – most of which is “invisible” dark matter (only 14% of the matter in the universe is ordinary matter of the kind we are made of) – is initially smooth except for tiny ripples with relative amplitudes of smaller than 1 part in 10^5 . Gravity amplifies these ripples to form the first generation structures, which under further influence of gravity merge to form successively larger systems as the Universe ages. This simple description, however, glosses over all the complexities that lend diversity and richness to the Cosmos. The different components (radiation, gas, dark matter, galaxies, stars) can mingle, impact and in some instances, even transform from one to the other or generate the other, in myriads of ways. Discovering the weft and warp of the corresponding physical processes requires creativity, passion and sometimes sheer doggedness. It involves hunting for clues, both hidden and obvious, and cultivating insights. And, while in other areas of science, clues and insights can be had by designing an experiment and repeating it over and over under different conditions, we (humans) are hardly in a position to tweak and repeat the Big Bang, except virtually. Using some of the most powerful supercomputers in the world, we can simulate the evolution of the Universe, replicating the Universe's 13.7 billion year history in anywhere from two weeks to several months, depending on the degree of detail that we wish to capture, and in doing so, we have learnt more about the physical Universe in the past 25 years than in the preceding 10,000 years spanning nearly the entirety of human civilization.

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ACADEMIC APPOINTMENTS AND HONORS

Faculty Appointments

- **Full Professor (University Distinguished Professor)** **07/03-**
Department of Physics and Astronomy, University of Victoria
 - Awarded “University of Victoria Distinguished Professor” title, University of Victoria’s highest academic recognition.
July 2007
 - Awarded Leverhulme Visiting Professorship tenable at Universities of Oxford and Durham
Jan 2005-May 2005; May 2006-Aug 2006
 - Awarded University of Victoria's Faculty of Science Award for Research Excellence
September 2004

- **Associate Professor (tenured)** **07/99-06/03**
Department of Physics and Astronomy, University of Victoria
 - Awarded Canadian Institute for Theoretical Astrophysics Senior Fellowship
September 2002-December 2002

- **Assistant Professor** **07/97-06/99**
Department of Physics and Astronomy, University of Victoria
 - Awarded Canada Foundation for Innovation Researcher Award (New Opportunities)
August 1998

- **Assistant Professor** **09/04-06/97**
Department of Physics, New York University
 - Awarded Judge Frances Bergan Career Development Award
September 1995
 - By Invitation Only: U.S. National Academy of Science’s Frontier of Science Workshop for 100 Young Outstanding Researchers.
October 1995

EDUCATION AND TRAINING

Postdoctoral Appointments

- **Postdoctoral Research Fellow** **09/91-08/94**
Canadian Institute for Theoretical Astrophysics, University of Toronto
 - CITA National Fellowship (declined) 1993

- **NATO Science Fellow** **09/89-08/91**
Institute of Astronomy, University of Cambridge
 - NATO Science Fellowship 1989-1991

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Postgraduate

- **Ph.D. in Astrophysical Sciences** **Oct 1989**
Princeton University, Princeton, NJ, USA
Advisor: J.P. Ostriker
 - NSERC (Canada) Postgraduate Scholarship 1985-1989
 - Pierce Prize in Astrophysics 1987-1988
 - Princeton University Merit Prize 1985-1986

Undergraduate

- **B.A.Sc. (Dean's Honors) in Engineering Science (Physics/Aerospace)** **June 1985**
University of Toronto, Toronto, ON, Canada
Advisor: R.C. Desai
 - Aga Khan Foundation Canada Scholarship 1981-1985
 - Dean's Honors (Fall and Spring Semesters) 1981-1985
 - A.A. Kinghorn Scholarship 1984-1985
 - J.A. Priestly In-Course Scholarship 1983-1984
 - NSERC Undergraduate Research Award 1983
 - A.A. Kinghorn Scholarship 1982-1983
 - NSERC Undergraduate Research Award 1982
 - G.R. Mickle Admission Scholarship 1981-1982

SIGNIFICANT LEADERSHIP AND COMMUNITY SERVICE ACTIVITIES

Strategic, Policy and Tactical Planning

- **National and International Professional Committees and Governmental Agencies**
 - **CITA Council** **2007-2010**
CITA Council is the national governing body of the Canadian Institute for Theoretical Astrophysics
 - **National Interdisciplinary Ad Hoc Committee on High Performance Computing in Canada** **2006**
Natural Sciences and Engineering Research Council of Canada
 - **Herzberg Institute of Astrophysics Advisory Board** **1999-2002**
National Research Council of Canada
 - **Director and Founding Member, Canadian Computational Cosmology Collaboration** **2000-2008**
 - An NSERC Collaborative Research Opportunity Initiative linking researchers at University of Victoria, McMaster University, University of Washington, Institute for Computational Cosmology at the University of Durham, and the Max Planck Institute for Astrophysics.

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▪ University-based Departmental, Faculty and University-wide Committees

- **Center for Studies in Religion and Society's Faculty Program Committee** 2009-2012
University of Victoria
- **University of Victoria Communications' Ring Editorial Advisory Board** 2009-2010
University of Victoria
- **Dean's Teaching Advisory Committee (Faculty of Science)** 2009-2010
University of Victoria
- **Pacific Institute for Mathematical Sciences Steering Committee (Appointed Deputy Site Director: 2003-2004)** 1998-present
University of Victoria
- **High Performance Computing Strategic Planning Committee** 1998-2010
University of Victoria
- **Dean of Science Faculty Advisory Committee (alternative)** 2007-2008
University of Victoria
- **Vice-President Research's Search Committee for Site Director, Pacific Institute for Mathematical Sciences** 2007-2008
University of Victoria
- **Department of Physics and Astronomy Appointment, Reappointment, Promotion & Tenure (ARPT) Committee** 2006-2008
University of Victoria
- **Co-chair, Task Force to Revise Astronomy Undergraduate Curriculum** 2006-2007
University of Victoria
- **Canadian Institute for Advanced Research Scholar Search Committee** 2003-2004
University of Victoria
- **Canada Research Chair (Tier II) Search Committee** 2003-2004
University of Victoria
- **Canadian Institute for Advanced Research Scholar Search Committee** 2001-2002
University of Victoria
- **Canada Research Chair (Tier I) Search Committee** 2001-2002
University of Victoria
- **V.P. Research's Search Committee: Director, Centre for Studies in Religion and Society** 2001-2002
University of Victoria
- **Chair, Department of Physics External Relations and Recruitment Committee** 2000-2004
University of Victoria
- **Centre for Studies in Religion and Society Faculty Program Committee** 1999-2002
University of Victoria
- **Provost's Information Technology Strategic Planning Committee** 1998-1999
University of Victoria

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- **Dean of Science's Physics and Astronomy Departmental Chair Search Committee** 1997-1998
University of Victoria
- **Task Force, Science Core Program Curriculum Development** 1994-1997
Charged with developing and implementing the Natural Science I Section of New York University's new Science Core Program for Non-Science Students.

Leadership

- **National and International Professional Committees and Governmental Agencies**
 - **Co-Chair, Organizing Committee for the Canadian Cluster Comparison Project Workshop** Dec 2007
 - Sponsored by University of Hawaii and Canada-France-Hawaii Telescope
 - Held in Waimea, Hawaii
 - **Chair of Organizing Committee for workshop titled "Galaxy Formation: A Herculean Challenge"** Nov 2003
 - Sponsored by Pacific Institute for Mathematical Sciences
 - held at Banff International Research Station
 - **Invited to be the Convenor of Astrophysics and Gravity session (declined)** Nov 2003
 - Sixth Meeting of the American Physical Society's Northwest section
 - **Co-Chair, Organizing Committee for Victoria Computational Cosmology Conference** July 2000
 - Sponsored by UVic, PIMS, CIAR and CITA,
 - held in Victoria, Canada
 - **Chair of Astrophysics Section and Member of Local Organizing Committee for HPCS 2000** Aug 2000
 - Held in Victoria, Canada
 - **Director and Founding Member, Canadian Computational Cosmology Collaboration** 2000-2006
 - An NSERC Collaborative Research Opportunity Initiative linking researchers at University of Victoria, McMaster University, University of Washington, Institute for Computational Cosmology at the University of Durham, and the Max Planck Institute for Astrophysics.
- **University-based Departmental, Faculty and University-wide Committees**
 - **Organizer, Physics and Astronomy Lansdowne Scholar's Lecture** 2009
 - By Prof. Joseph Silk, Savilian Professor of Astronomy, University of Oxford
 - **Chair, Physics and Astronomy Colloquium Committee** 2009-2010
University of Victoria

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- **Chair, Physics and Astronomy Colloquium Committee** 2006-2008
University of Victoria
- **Co-Organizer, Public Exhibition on Scientific Visualization and Imagery titled "Art of Physics: Visualizing the Universe, Seeing the Unseen"** Oct 2005
•McPherson Library Gallery, University of Victoria
- **Organizer, Public Lecture on Islamic Astronomy, Univ. of Victoria** May 2005
•“Arabic Astronomy and Renaissance Europe: Influence of Tusi on Copernicus”, by Prof. George Saliba (Columbia University)
- **Panel member, University Review Committee** 2003-2006
University of Victoria
- **Deputy Site Director, Pacific Institute for Mathematical Sciences** 2003-2004
University of Victoria
- **Organizer, Public Lecture on Islamic Ethics** 2003
•By Aryn Sajoo (SFU/IIS), jointly sponsored by the Faculty of Humanities, the Dean of Humanities and CSRS.
- **Chair of Local Organizing Committee, University-Community Joint Commemoration of Prophet Muhammad’s Birthday** 2003
•Keynote Address by Dr. Sajida Alvi
•Jointly sponsored by the Faculty of Humanities, the Dean of Humanities, CSRS and the local Muslim Communities
- **Organizer, University of Victoria President’s Distinguished Lecture on Islamic Societies** Mar 2002
•By anthropologist/director Prof. Akber Ahmed (American University)
- **Organizer, American Astronomical Society Second Century Public Lecture at the University of Victoria** Oct 2002
•By Paul Butler (Carnegie Institute of Washington), co-recipient of 2001 2001 Henry Draper Medal
- **Founding Member, Dean of Humanities’ Multidisciplinary Working Group on Islamic Civilization** 2003-2005
University of Victoria
- **Chair of Local Organizing Committee, University-Community Joint Commemoration of Prophet Muhammad’s Birthday** 2003
•Keynote Address titled “Islamic Ideals, Modern Realities”, by Dr. Ebrahim Moosa (Stanford University)
•Jointly sponsored by the Faculty of Humanities, the Dean of Humanities, CSRS and the local Muslim Communities
- **Founding Member and Chair of Steering Committee, University of Victoria-Ismaili Community Collaborative Projects in Arts and Culture** 2001-2003
- **Principal Investigator and Lead Coordinator of Experimental Laboratory for Instrument Development in Astrophysics (ELIDA)** 2001-2004
University of Victoria/Herzberg Institute of Astrophysics
- **Organizer, University of Victoria President’s Distinguished Lecture** July 2000
•By J.P. Ostriker, Provost and Charles E. Young Professor of Astrophysics (Princeton University)

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Community and Professional Service

▪ National and International Professional Committees and Governmental Agencies

- **Referee for the peer-reviewed scientific journal articles submitted to** 1990-present
 - Monthly Notices of the Royal Astronomical Society (UK),
 - Astrophysical Journal
 - Astronomy & Astrophysics, etc.
- **Referee for research grant proposals submitted to:** 2004-present
 - NSERC (Canada),
 - PPARC (UK),
 - Israeli Science Foundation (Israel),
 - Government of Alberta's Advanced Education and Technology Peer Reviewed Small Equipment Grants Program,
 - Canada Foundation for Innovation,
 - Canada Research Chairs Program
 - Christopherson/Knott Fellowship (IAS, University of Durham)
 - CFHT/Gemini Observing Proposals
- **National Science Foundation (USA)'s Extragalactic Grants Adjudication Committee** 2005 & 2005
Declined due to schedule conflict
- **National Interdisciplinary Ad Hoc Committee on High Performance Computing in Canada** 2006
Natural Sciences and Engineering Research Council of Canada
- **Cosmology Panel of the Hubble Space Telescope Time Allocation/Archival Grant Review Committee** 1999-2002
NASA/STScI
- **Member, Local Organizing Committee** 2001
Canadian Association of Physicists Annual Meeting
- **Referee for telescope proposals submitted to Canada-France-Hawaii Telescope and the Gemini Telescopes** 1998-2009
HIA/NRC
- **Member, Local Organizing Committee** 1998
Kingston'98 Meeting "Galaxy Formation and Cosmic Star Formation History", sponsored by McMaster University and CITA, held at McMaster University
- **Member, Local Organizing Committee** 1994
Lake Traverse-Algonquin Cosmology Workshop, sponsored by CIAR, CITA and Queens University
- **Member, Local Organizing Committee** 1991
NATO Advanced Study Institute "Clusters and Superclusters of Galaxies" held at the Institute of Astronomy, University of Cambridge

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▪ University-based Departmental, Faculty and University-wide Committees

- **Faculty of Science Dean's Teaching Advisory Committee** 2009-2010
University of Victoria
- **Majors & Honours Advising Committee** 2007-2008
University of Victoria
- **Physics and Astronomy Colloquium Committee** 2006-2008
University of Victoria
- **Physics Laboratory and Computer Resources Committee** 2005-2007
University of Victoria
- **Member, Local Organizing Committee for University-Community Post-September 11th Workshop "Voices of Frustration, Voices of Hope"** 2002
University of Victoria
- **President's Distinguished Lecture Series Committee** 2001-2006
University of Victoria
- **Petrie Fellowship Committee** 1999-present
University of Victoria
- **Co-op Program Committee** 1999-2004
University of Victoria
- **Physics and Astronomy Colloquium Committee** 1998-1999
University of Victoria
- **Physics Laboratory and Computer Resources Committee** 1997-2003
University of Victoria
- **Physics and Astronomy Graduate Committee** 1997-1999
University of Victoria
- **Physics Graduate Admissions Committee** 1994-1997
New York University

POSTDOCTORAL, POSTGRADUATE AND UNDERGRADUATE MENTORING

Postdoctoral

- **Edward Pope** 09/08-09/09
Current Position: In residence at University of Victoria
- **Greg Poole** 03/07-06/07
Current Position: Postdoctoral Fellow: Swinburne University of Technology
- **Andisheh Mahdavi** 09/05-08/08
Current Position: Assistant Professor, San Francisco State University
- **Mario Abadi** 09/03-05/05
Current Position: Associate Professor, University of Cordoba
- **Mark Fardal** 09/01-12/04
Current Position: Research Associate, University of Massachusetts
- **Joachim Stadel** 12/00-06/02
Current Position: Research Associate, University of Zurich

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- **Liliya L.R. Williams** 09/98-08/99
Current Position: Associate Professor, University of Minnesota
- **Zdenka Kuncic** 09/97-08/99
Current Position: Senior Lecturer, University of Sydney
- **Geraint Lewis** 09/97-08/99
Current Position: Professor, University of Sydney

Postgraduate

- **Razzi Movassaghi** 01/09-
Current Position: M.Sc. in progress (supervisor)
- **Chris Bildfell** 09/03-
Current Position: Ph.D. in progress (co-supervisor)
- **Aida Ghazvinizadeh** 09/04-06/08
Current Position: Ph.D. student at the University of Toronto
- **Greg Poole** 09/99-06/07
Current Position: PDF, Swinburne University of Technology
Awarded Governor General's Gold Medal for outstanding Ph.D. thesis
- **Ian McCarthy (Ph.D.)** 09/00-07/05
Current Position: Kavli Fellow, University of Cambridge
- **Jonathan Geehan (M.Sc.)** 09/02-07/05
Current Position: Graduated from Faculty of Education, University of Victoria
Mathematics & Science Teacher at Esquimalt High School, Victoria
- **Karun Thanjavur (M.Sc.)** 09/02-08/04
Current Position: Ph.D. Student, University of Victoria
- **James Taylor (Ph.D.)** 09/97-08/01
Current Position: Assistant Professor, University of Waterloo

Undergraduate

- **Patrick Ingram** 01/07-04/07
Undergraduate Research Project
- **Rahul Mittal** 05/06-08/06
Research Assistant
- **Matthew Quinn** 05/06-08/06
NSERC USRA
- **Matthew Quinn** 05/05-08/05
NSERC USRA
- **Luke Stern** 05/04-08/04
Research Assistant
- **Luke Stern** 05/03-08/03
NSERC USRA
- **Suresh Sivanandam** 05/02-08/02
NSERC USRA
- **Jeffrey Wagg** 09/01-06/02
Independent Research Project

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- **David Sone** 05/01-08/01
NSERC USRA
- **Jeffrey Wagg** 09/00-12/00
Directed Studies
- **David Sone** 05/00-08/00
NSERC USRA

ACADEMIC TEACHING EXPERIENCE

Postgraduate Level

- **Instructor, ASTR 580, *Directed Studies: Current Issues in Cosmic Structure Formation***
Department of Physics and Astronomy, University of Victoria
Summer 2004, Spring 2004, Fall 2003, Fall 2000, Fall 1999
- **Instructor, ASTR 511, *Cosmological Physics***
Department of Physics and Astronomy, University of Victoria
Spring 2002, Spring 2000, Fall 1997
- **Instructor, ASTR 511, *Galactic Dynamics***
Department of Physics and Astronomy, University of Victoria
Spring 2002, Fall 1999
- **Organizer, PHYS 560, *Graduate Physics Seminar***
Department of Physics and Astronomy, University of Victoria
Spring 2010, Fall 2009, Spring 2008, Fall 2007, Spring 2007, Fall 2006, Spring 1999, Fall 1998
- **Co-lecture, *Selected Topic in Astrophysics***
Department of Astronomy, University of Toronto
Spring 1994

Undergraduate Level

- **Instructor, ASTR 403, *Introduction to Astrophysical Processes (Radiative Processes)***
Department of Physics and Astronomy, University of Victoria
Fall 2009
- **Instructor, PHYS 102, *General Physics***
Department of Physics and Astronomy, University of Victoria
Spring 2009
- **Instructor, ASTR 402, *Galactic Dynamics***
Department of Physics and Astronomy, University of Victoria
Spring 2006, Spring 1999
- **Instructor, ASTR 303, *Extragalactic Astrophysics***
Department of Physics and Astronomy, University of Victoria
Fall 2007, Fall 2006, Fall 2005, Fall 2004, Fall 2003, Fall 2001, Fall 2000, Fall 1999, Fall 1998
- **Instructor, PHYS 303, *Creation of Space, Time, Matter & Energy (non-science)***
Department of Physics and Astronomy, University of Victoria
Fall 2009, Spring 2009, Fall 2007, Fall 2006, Fall 2005, Fall 2004, Fall 2003, Fall 2002, Fall 2001, Fall 2000, Fall 1999, Spring 1999, Spring 1998
- **Instructor, ASTR 490, *Directed Studies: Advanced Topics in Galaxy Formation***

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Department of Physics and Astronomy, University of Victoria
Fall 2006, Fall 2003, Spring 2002, Fall 2000

- **Instructor, PHYS 460, *Physics Seminar***
Department of Physics and Astronomy, University of Victoria
Spring 2010, Fall 2009, Spring 2008, Fall 2007, Spring 2007, Fall 2006, Spring 1999, Fall 1998
- **Instructor, *Mathematical Physics***
Department of Physics, New York University
Spring 1997
- **Instructor, *Natural Science I (Morse Academic Plan)***
Department of Physics, New York University
Spring 1997, Spring 1996
- **Instructor, *The Universe: Its Nature and History***
Department of Physics, New York University
Fall 1996, Fall 1995

PROFESSIONAL AND PUBLIC LECTURES AND OUTREACH ACTIVITIES

Professional Presentations: Colloquia, Conferences and Workshop (1995-present)

- Colloquium Lecture, Dept. of Astronomy, University of Washington, USA Sept 1995
- Astronomy Seminar, Dept. of Physics & Astronomy, Rutgers University, USA Nov 1995
- Graduate Student Seminar, Dept. of Astrophysical Sciences, Princeton University, USA Feb 1996
- Astrophysics Seminar, Dept of Astronomy, Columbia University, USA Feb 1996
- Invited Member of Concluding Panel, Workshop on Low Luminosity Galaxies, Space Telescope Science Institute, Baltimore, USA Mar 1996
- Colloquium Lecture, Dept of Physics & Astronomy, University of Victoria, Canada Mar 1996
- Astronomy Seminar, Dept of Physics & Astronomy, University of Victoria, Canada Mar 1996
- Invited Speaker, “Cosmology: The Big Picture” Conference, Iqaluit, Canada. Aug 1996
- Invited Speaker, Gravitational Lensing Session, American Astronomical Society Meeting, Toronto, Canada Jan 1997
- Colloquium, Dept. of Physics & Astronomy, University of Massachusetts, USA Feb 1998
- Colloquium Lecture, Dept of Physics & Astronomy, University of British Columbia, Canada Mar 1998
- Invited Speaker, Kingston’98 Meeting “Galaxy Formation and Cosmic Star Formation History”, Hamilton, Canada Oct 1998
- Invited Speaker (declined), 1999 Aspen Winter Astrophysics Workshop, USA Jan 1999
- Colloquium Lecture, Hertzberg Institute for Astrophysics, Canada May 1999
- Invited Speaker, “Mi99: The Evolution of Galaxies in Clusters” Workshop, Milan, Italy Jun 1999
- Colloquium Lecture, Osservatorio Astrofisico di Arcetri, Florence, Italy Jun 1999
- Colloquium Lecture, Astronomical Observatory of Padua, Italy Jun 1999
- Colloquium Lecture, Department of Physics, University of Zurich, Switzerland Jun 1999

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- Invited Speaker (declined), 4th “Guillermo Haro” International Workshop “Large-scale structure and Cluster of Galaxies”, Puebla, Mexico. Jul 1999
- Astrophysics seminar, Institute of Theoretical Physics at University of California, Santa Barbara (during course of Galaxy Formation Workshop – invited participant), USA Feb 2000
- Provost’s Lecture Series: Conversations with Colleagues, “Back to the Beginning: Understanding the Large Scale Structure of the Universe”, University of Victoria, Canada Jan 2001
- 2001 Aspen Winter Conference on Astrophysics, Aspen USA. Jan 2001
- Colloquium Lecture, Department of Astronomy, University of Washington, USA Oct 2001
- Invited speaker, (declined), Cosmology Seminar, University of Minnesota, USA Oct 2001
- Invited Speaker (declined because of 9/11), Bologna Workshop on Galactic Winds, Osservatorio Astronomica di Bologna, Bologna, Italy Feb 2002
- Cosmology Seminar, School of Physics and Astronomy, University of Birmingham, UK Apr 2002
- Astronomy Seminar, Astrophysics, University of Oxford, UK May 2002
- Invited Speaker, The 2002 Lowell Observatory Workshop “The Outer Edges of Dwarf Irregular Galaxies: Stars and Gas” Oct 2002
- Colloquium Lecture, Perimeter Institute, Waterloo, Canada Oct 2002
- Astronomy Colloquium (deferred to Spring semester), University of California at Santa Cruz, Santa Cruz, USA Oct 2002
- Astrophysics Seminar, Canadian Institute for Theoretical Astrophysics, Canada Oct 2002
- Astronomy Seminar, Case Western University, USA Nov 2002
- Astrophysics Seminar, Institute for Advanced Studies, Princeton, USA Nov 2002
- Colloquium Lecture, Hertzberg Institute for Astrophysics, Canada May 2003
- Colloquium Lecture, Lick Observatory University of California at Santa Cruz, USA May 2003
- Invited participant “Cosmology with the Sunyaev-Zel’dovich Effect” held at the Seisenryo Seminary House, Kiyosato, Yamanashi-Prefecture, Japan (declined) Jun 2003
- Invited Oral Presentation, Multi-wavelength Cosmology Conference, Mykonos, Greece Jun 2003
- Astrophysics Seminar, Dept. of Physics and Astronomy, University of California at Santa Barbara, USA Mar 2004
- Invited Seminar, Dept. of Physics, University of Durham, UK (declined) Mar 2004
- Participant (by invitation only), Plumian 300: “The Quest for a Concordance Cosmology and Beyond,” Institute of Astronomy, Cambridge, UK Jul 2004
- Colloquium Lecture, Astronomy Dept., University of Minnesota, USA Oct 2004
- Colloquium Lecture, Kavli Institute for Theoretical Physics, University of California at Santa Barbara, USA Dec 2004
- Colloquium Lecture, Institute of Astronomy, University of Cambridge, UK Feb 2005
- Cosmology Seminar speaker, University of Oxford, Oxford, UK Feb 2005
- Contributed lecture, conference titled "The Future of Cosmology with Clusters of Galaxies", held in Kona Hawaii, USA Feb 2005
- Colloquium Lecture, Astrophysics, University of Oxford, UK Mar 2005
- Colloquium Lecture, L'Institut d'Estudis Espacials de Catalunya, Universitat Autònoma de Barcelona, Spain Mar 2005

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- Invited Seminar, University College, Department of Physics and Astronomy, London, UK Mar 2005
- Invited Seminar, Department of Physics, University of Durham, Durham, UK Apr 2005
- Colloquium Lecture, Astrophysics Institute Potsdam, Potsdam, Germany Apr 2005
- Astronomy/Astrophysics Seminar, Department of Physics, University of Birmingham, UK Jun 2005
- Colloquium Lecture, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India Jul 2005
- Colloquium Lecture, Department of Physics, Indian Institute of Technology (Bangalore), India Jul 2005
- Astrophysics Seminar, Raman Research Institute, Bangalore, India Jul 2005
- Invited speaker, 21st Institut d'Astrophysique workshop titled "Mass Profiles and Shapes of Cosmological Structures", held in Paris, France (declined) Apr 2006
- Invited speaker, "Dark Haloes Workshop", UBC, Vancouver, Canada Sep 2006
- Invited speaker, "The Role of Black Hole in Galaxy Formation and Evolution", IV Potsdam Thinkshop, Potsdam, Germany Feb 2007
- Colloquium Speaker, Department of Astronomy, University of Massachusetts, USA Mar 2007
- Invited speaker, Ringberg Workshop on "The Impact of AGN Feedback on Galaxy Evolution: Theoretical Modelling and Observational Signatures", Schloss Ringberg, Germany May 2007
- Astrophysics Seminar, Beecroft Institute for Particle Astrophysics and Cosmology, University of Oxford, UK Jun 2007
- Astrophysics Seminar, Institut d'Astrophysique de Paris, Paris, France Jun 2007
- Astronomy Seminar, University of Oxford, Oxford, UK Jun 2007
- Colloquium Speaker, Centre for Astrophysics and Supercomputing, Swinburne University of Technology, Australia Jun 2008
- Invited Speaker, Lorentz Centre Workshop titled "The Cool, Cooler and Cold - Cluster Cooling Flows in a New Light", Leiden, Netherlands Sep 2008
- Colloquium Speaker, Theoretical Astrophysics Colloquium, Department of Astronomy, Steward Observatory, University of Arizona, USA Oct 2008
- Invited Speaker (declined), "Dark2009: Seventh International Heidelberg Conference on Dark Matter in Astro & Particle Physics" University of Canterbury, Christchurch, New Zealand Jan 2009
- Invited Speaker, "Conference on Galaxy Evolution and Environment", Kuala Lumpur, Malaysia Mar 2009
- Colloquium Speaker, Astronomy & Astrophysics, Hong Kong University, Hong Kong Apr 2009
- Invited Speaker, "Sunyaev-Zeldovich Universe and the Future of Cluster Cosmology" conference, Perimeter Institute, CA Apr 2009
- Invited Astronomy Seminar, School of Physics and Astronomy, University of Birmingham, UK May 2009
- Invited Speaker, "Open Problems In Galaxy Formation", VI Potsdam Thinkshop, Germany May 2009
- Invited Speaker (declined), "SZ@Bonn 2009: A Multi-wavelength Look at Galaxy Clusters", Bonn, Germany Jul 2009
- Invited Participant, "The Astrophysics at the Extreme", Racah Institute for Dec 2009

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Physics, Hebrew University, Jerusalem, Israel.

- Invited Astrophysics Seminar, NASA Marshall Space Flight Center (MSFC)'s X-Ray Astronomy Group, National Space Science Technology Center on University of Alabama campus, Huntsville, Alabama Feb 2010

Public Lectures and Exhibitions on Cosmology, Astrophysics and Science in general

- **Invited Speaker** July 2009
 - The Book Club, Ismaili Jamat Khana and Centre, Vancouver, Canada
- **Invited Public Lecture: “Science and Society in the 21st Century”** May 2009
 - Ismaili Centre, London, UK
- **Invited Public Lecture: “How Did The Universe Begin? Clues From Galactic Structures & Cosmic Radio Waves”** Jan 2009
 - Joint public lecture with Mark Halpern, UBC
 - Organized by the MISC Institute; venue: Green College, UBC
- **Invited Public Lecture (declined)** Nov 2003
 - Royal Astronomical Society of Canada (Victoria Chapter), Canada
- **Invited Public Lecture: “Beyond the Spherical Cow: Computing the Universe”** Oct 2003
 - H.R. MacMillan Space Centre, Vancouver, Canada
- **Invited art/video installation using numerical simulations of cosmic structure formation: “Computing the Universe: Replicating Nature’s Cosmic Sculptures”** Sept - Nov 2003
 - Part of exhibition on “Spheres”, Presentation House Gallery, Vancouver, BC
- **Invited Public Lecture: “Formation and Evolution of Structure in the Universe”** Apr 2001
 - Astronomy Day 2001, Royal British Columbia Museum, Victoria BC
 - Organized by the Royal Astronomical Society of Canada (Victoria)
- **Invited Public Lecture: “Back to the Beginning: Understanding the Large Scale Structure of the Universe”** Feb 2001
 - Royal Astronomical Society of Canada (Victoria Chapter), Victoria, Canada
- **Invited Lecture: “History of the Universe, Part I”** Mar 1998
 - University of Victoria Ismaili Students Association and the Ismaili Community of Victoria
- **Invited Public Lecture: “Faint Galaxies and the Hubble Deep Field”** Feb 1997
 - The American Museum of Natural History, New York, USA
- **Invited Public Lecture: “The Big Bang: An Introduction to Modern Cosmology”** Oct 1993
 - Organized by University of Toronto Ismaili Students Association, Canada

K-12 Science and Astronomy Outreach

- **Invited Lecture: “Classification & Identification using Spectral Lines”** Dec 2009
 - Grades 5 & 6 Science classes, Chartwell Elementary School, Vancouver, Canada
- **Invited Lecture: “Astronomy via Space Satellites”** Dec 2006
 - Grades 5 & 6 Science classes, Chartwell Elementary School, Vancouver,

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Canada

- **Electricity Demonstration** Jun 2004
 - Grade 1, Selkirk Montessori School, Victoria, Canada
- **Invited Lectures: “Applied Science and Third World Development”** May 2004
 - K-7 classes (8 lectures in all), Selkirk Montessori School, Victoria, Canada
- **Astronomy Outreach and Guest Lecturer: “The Solar System”** Jun 2003
 - Grades 1 and 2, Selkirk Montessori School, Victoria, Canada
- **Astronomy Outreach and Guest Lecturer: “The Solar System”** Jun 2001
 - Grades 1 and 2, Uplands Elementary School, Victoria, Canada
- **Electricity Demonstration** Mar 2001
 - Grade 1 and 2, Uplands Elementary School, Victoria, Canada
- **Guest Lecturer: “The Universe”** Dec 1997
 - Grade 7 Science class, Willows Elementary School, Victoria, Canada
- **Guest Lecturer: “Big Bang and Other Stories of the Cosmos”** Jun 1992
 - Grade 11 Astronomy class, Marc Garneau Collegiate Inst., Toronto, Canada

PUBLICATIONS

Articles in Refereed Journals

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