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## Curriculum Vitae

PAOLO GONDOLO

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Director of the Institute for High Energy Astrophysics, University of Utah (since 2009)  
Professor, University of Utah (since 2009)  
Researcher, Tokyo Institute of Technology (2021)  
Affiliate Member, Institute for the Physics and Mathematics of the Universe, University of Tokyo (since 2021)

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Ph.D. in Physics, 1991 (University of California, Los Angeles. Advisor: Graciela Gelmini)  
B.S. in Physics (Laurea), 1986 (University of Trieste, Italy. Advisor: Fabio Mardirossian)

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## Employment History

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### Faculty Employment

2009–: Professor, University of Utah.  
2006–2009: Associate Professor, University of Utah.  
2003–2006: Assistant Professor, University of Utah.  
2000–2003: Visiting Assistant Professor, Case Western Reserve University, Cleveland, Ohio.

### Post-doctoral Employment

1997–2000: Postdoctoral Researcher, Max Planck Institute for Physics, Munich, Germany (Supervisor: Leo Stodolsky).  
1996–1997: Visitor, Department of Astronomy & Center for Particle Astrophysics, University of California, Berkeley (Supervisor: Joseph Silk).  
1995–1996: Postdoctoral Research Assistant, Department of Theoretical Physics, University of Oxford, Oxford, UK (Supervisor: Subir Sarkar).  
1993–1995: CNRS Postdoctoral Researcher, Department of Theoretical Physics, University of Paris 6 & 7 (Jussieu), Paris, France (Supervisors: Alain Bouquet and Jean Kaplan).  
1991–1993: Postdoctoral Fellow in Astroparticle Physics, Institute of Radiation Sciences, University of Uppsala, Uppsala, Sweden (Supervisor: Hector Rubinstein).

## **Student Employment**

1989–1991: Graduate Research Assistant, Department of Physics, University of California, Los Angeles (Supervisor: Graciela Gelmini).

1987–1990: Doctoral Fellow, Department of Astronomy, University of Trieste, Italy (Supervisor: Margherita Hack).

1986–1987: Doctoral Fellow, Astronomical Observatory, Trieste, Italy (Supervisor: Marino Mezzetti).

1985: Summer Student, CERN, Geneva, Switzerland (Supervisor: Luigi Rolandi).

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## **Education**

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### **Universities**

Graduate Student, Physics, University of California, Los Angeles, 1989-1991.

Doctoral Student, Physics, University of Trieste, Italy, 1988-1989.

Undergraduate Student in Physics, University of Trieste, Italy, 1981-1985.

### **International schools**

International School of Astroparticle Physics "The Early Universe and its Observable Consequences for Particle Physics," Erice, Italy, 1989.

Scottish Universities Summer School "Physics of the Early Universe," Edinburgh, Scotland, 1989.

International School of Particle Astrophysics "Dark Matter in the Universe," Erice, Italy, 1988.

International School of Astroparticle Physics "A Unified View of the Micro- and Macro-Cosmos," Erice, Italy, 1987.

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## **Honors**

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Fellow of the American Physical Society, since 16 Sept 2016.

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## RESEARCH: Publications

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### Preprints

197. Reionization in the light of dark stars.  
*Paolo Gondolo, Pearl Sandick, Barmak Shams Es Haghi, Eli Visbal*  
arXiv:2112.04525 Dec 2021

### Published in refereed journals

196. Slowly rotating gravastars.  
*Philip Beltracchi, Paolo Gondolo, Emil Mottola*  
Physical Review D 105 (2022) 2, 024002
195. Surface stress tensor and junction conditions on a rotating null horizon.  
*Philip Beltracchi, Paolo Gondolo, Emil Mottola*  
Physical Review D 105 (2022) 2, 024001
194. Physical interpretation of Newman-Janis rotating systems. II: General systems.  
*Philip Beltracchi, Paolo Gondolo*  
Physical Review D 104 (2021) 12, 124067
193. Physical interpretation of Newman-Janis rotating systems. I: A unique family of Kerr-Schild systems.  
*Philip Beltracchi, Paolo Gondolo*  
Physical Review D 104 (2021) 12, 124066
192. Phenomenology of nuclear scattering for a WIMP of arbitrary spin.  
*Paolo Gondolo, Injun Jeong, Sunghyun Kang, Stefano Scopel, Gaurav Tomar*  
Physical Review D 104 (2021) 6, 063018.
191. Effective theory of nuclear scattering for a WIMP of arbitrary spin.  
*Paolo Gondolo, Sunghyun Kang, Stefano Scopel, Gaurav Tomar*  
Physical Review D 104 (2021) 6, 063017.
190. Effects of primordial black holes on dark matter models.  
*Paolo Gondolo Pearl Sandick, Barmak Shams Es Haghi*  
Physical Review D 102 (2020) 9, 095018.
189. An exact time-dependent interior Schwarzschild solution.  
*Philip Beltracchi, Paolo Gondolo*  
Physical Review D 99 (2019) 084021.
188. Formation of dark energy stars.  
*Philip Beltracchi, Paolo Gondolo*  
Physical Review D 99 (2019) 044037.
187. Anapole dark matter after DAMA/LIBRA-phase2.  
*Sunghyun Kang, Stefano Scopel, Gaurav Tomar, Jong-Hyun Yoon, Paolo Gondolo*  
Journal of Cosmology and Astroparticle Physics 11 (2018) 040.

186. DarkSUSY 6: An advanced tool to compute dark matter properties numerically.  
*Torsten Bringmann, Joakim Edj , Paolo Gondolo, Piero Ullio, Lars Bergstr m*  
Journal of Cosmology and Astroparticle Physics 07 (2018) 033.
185. Magnetic seed and cosmology as quantum Hall effect  
*Horacio Falomir, Jorge Gamboa, Paolo Gondolo, Fernando Mendez*  
Physics Letters B785 (2018) 399.
184. Examining the time dependence of DAMA's modulation amplitude.  
*Chris Kelso, Christopher Savage, Pearl Sandick, Katherine Freese, Paolo Gondolo*  
European Physical Journal C 78 (2018) 223.
183. Inflation without inflaton: A model for dark energy.  
*Horacio Falomir, Jorge Gamboa, Fernando Mendez, Paolo Gondolo*  
Physical Review D 96 (2017) 083534.
182. Halo-independent determination of the unmodulated WIMP signal in DAMA: the isotropic case.  
*Paolo Gondolo, Stefano Scopel*  
Journal of Cosmology and Astroparticle Physics 09 (2017) 032.
181. Inverted dipole feature in directional detection of exothermic dark matter.  
*Nassim Bozorgnia, Graciela B. Gelmini, Paolo Gondolo*  
Journal of Cosmology and Astroparticle Physics 01 (2017) 052.
180. Factorizations into normal matrices in indefinite inner product spaces.  
*Xuefang Sui, Paolo Gondolo*  
Linear Algebra and Its Applications, 516 (2017) 143.
179. A new polar decomposition in indefinite inner product spaces.  
*Xuefang Sui, Paolo Gondolo*  
Linear Algebra and Its Applications, 516 (2017) 126.
178. Late kinetic decoupling of light magnetic dipole dark matter.  
*Paolo Gondolo, Kenji Kadota*  
Journal of Cosmology and Astroparticle Physics 06 (2016) 012.
177. A review of the discovery reach of directional Dark Matter detection.  
*F. Mayet, A.M. Green, J.B.R. Battat, J. Billard, N. Bozorgnia, G.B. Gelmini, P. Gondolo, B.J. Kavanagh, S.K. Lee, D. Loomba, J. Monroe, B. Morgan, C.A.J. O'Hare, A.H.G. Peter, N.S. Phan, S.E. Vahsen*  
Physics Reports, 627 (2016) 1.
176. Extended maximum-likelihood halo-independent analysis of dark matter direct detection data.  
*Graciela Gelmini, Andreea Georgescu, Paolo Gondolo, Ji-Haeng Huh*  
Journal of Cosmology and Astroparticle Physics 11 (2015) 038.
175. Global limits and interference patterns in dark matter direct detection.  
*Riccardo Catena, Paolo Gondolo*  
Journal of Cosmology and Astroparticle Physics 08 (2015) 022.
174. Kinetic decoupling of WIMPs: analytic expressions.  
*Luca Visinelli, Paolo Gondolo*  
Physical Review D91 (2015) 8, 083526.
173. Global fits of the dark matter-nucleon effective interactions.  
*Riccardo Catena, Paolo Gondolo*  
Journal of Cosmology and Astroparticle Physics 09 (2014) 045.

172. Axion cold dark matter in view of BICEP2 results.  
*Paolo Gondolo, Luca Visinelli*  
Physical Review Letters 113 (2014) 011802.
171. Towards a realistic model of quarks and leptons, leptonic CP violation and neutrinoless  $\beta\beta$ -decay.  
*Yanghwan Ahn, Paolo Gondolo*  
Physical Review D91 (2015) 1, 013007.
170. Direct detection of light anapole and magnetic dipole DM.  
*Eugenio Del Nobile, Graciela B. Gelmini, Paolo Gondolo, Ji-Haeng Huh*  
Journal of Cosmology and Astroparticle Physics 06 (2014) 002.
169. Update on Light WIMP Limits: LUX, lite, and Light.  
*Eugenio Del Nobile, Graciela B. Gelmini, Paolo Gondolo, Ji-Haeng Huh*  
Journal of Cosmology and Astroparticle Physics 03 (2014) 014.
168. Wanted! Nuclear Data for Dark Matter Astrophysics.  
*Paolo Gondolo*  
Nuclear Data Sheets 120 (2014) 175.
167. Generalized halo-independent comparison of direct dark matter detection data.  
*Eugenio Del Nobile, Graciela B. Gelmini, Paolo Gondolo, Ji-Haeng Huh*  
Journal of Cosmology and Astroparticle Physics 10 (2013) 048.
166. On the sbottom resonance in dark matter scattering.  
*Paolo Gondolo, Stefano Scopel*  
Journal of Cosmology and Astroparticle Physics 10 (2013) 032.
165. Halo-independent analysis of direct detection data for light WIMPs.  
*Eugenio Del Nobile, Graciela B. Gelmini, Paolo Gondolo, Ji-Haeng Huh*  
Journal of Cosmology and Astroparticle Physics 10 (2013) 026.
164. Simple renormalizable flavor symmetry for neutrino oscillations.  
*Yanghwan Ahn, Seungwon Baek, Paolo Gondolo*  
Physical Review D86 (2012) 053004.
163. Aberration features in directional dark matter detection.  
*Nassim Bozorgnia, Graciela Gelmini, Paolo Gondolo*  
Journal of Cosmology and Astroparticle Physics 1208 (2012) 011.
162. The effect of quark interactions on dark matter kinetic decoupling and the mass of the smallest dark halos.  
*Paolo Gondolo, Junji Hisano, Kenji Kadota*  
Physical Review D86 (2012) 083523.
161. Halo independent comparison of direct dark matter detection data.  
*Paolo Gondolo, Graciela Gelmini*  
Journal of Cosmology and Astroparticle Physics 1212 (2012) 015.
160. Ring-like features in directional dark matter detection.  
*Nassim Bozorgnia, Graciela Gelmini, Paolo Gondolo*  
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159. Light dark matter in leptophobic  $Z'$  models.  
*Paolo Gondolo, Pyungwon Ko, Yuji Omura*  
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158. Impacts of dark stars on reionization and signatures in the cosmic microwave background.  
*Pat Scott, Aparna Venkatesan, Elinore Roebber, Paolo Gondolo, Elena Pierpaoli, Gil Holder*  
*Astrophysical Journal* 742 (2011) 129.
157. Channeling in solid Xe, Ar, and Ne direct dark matter detectors.  
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*Nuclear Instruments and Methods A*654 (2011) 162.
156. Daily modulation due to channeling in direct dark matter crystalline detectors.  
*Nassim Bozorgnia, Graciela Gelmini, Paolo Gondolo*  
*Physical Review D*84 (2011) 023516.
155. XENON10/100 dark matter constraints in comparison with CoGeNT and DAMA: examining the  $\mathcal{L}_{\text{eff}}$  dependence.  
*Christopher Savage, Graciela Gelmini, Paolo Gondolo, Katherine Freese*  
*Physical Review D*83 (2011) 055002.
154. The WIMP capture process for dark stars in the early universe.  
*Sofia Sivertsson, Paolo Gondolo*  
*Astrophysical Journal* 729 (2011) 51.
153. Channeling in direct dark matter detection III: channeling fraction in CsI crystals.  
*Nassim Bozorgnia, Graciela Gelmini, Paolo Gondolo*  
*Journal of Cosmology and Astroparticle Physics* 1011 (2010) 029.
152. Channeling in direct dark matter detection II: channeling fraction in Si and Ge crystals.  
*Nassim Bozorgnia, Graciela Gelmini, Paolo Gondolo*  
*Journal of Cosmology and Astroparticle Physics* 1011 (2010) 028.
151. Channeling in direct dark matter detection I: channeling fraction in NaI (Tl) crystals.  
*Nassim Bozorgnia, Graciela Gelmini, Paolo Gondolo*  
*Journal of Cosmology and Astroparticle Physics* 1011 (2010) 019.
150. Dark Matter that can form Dark Stars.  
*P. Gondolo, Ji-Haeng Huh, Hyung Do Kim, S. Scopel*  
*Journal of Cosmology and Astroparticle Physics* 1007 (2010) 026.
149. Positrons in Cosmic Rays from Dark Matter Annihilations for Uplifted Higgs Regions in MSSM.  
*K. Kadota, K. Freese, P. Gondolo*  
*Physical Review D*81 (2010) 115006.
148. Finding high redshift dark stars with the James Webb Space Telescope.  
*E. Zackrisson, P. Scott, C.-E. Rydberg, F. Iocco, B. Edvardsson, G. Ostlin, S. Sivertsson, A. Zitrin, T. Broadhurst, P. Gondolo*  
*Astrophysical Journal* 717 (2010) 257.
147. Axion cold dark matter in non-standard cosmologies.  
*L. Visinelli, P. Gondolo*  
*Physical Review D*81 (2010) 063508 [18 pages].
146. The case for a directional dark matter detector and the status of current experimental efforts.  
*S. Ahlen et al.*  
*International Journal of Modern Physics A*25 (2010) 1.

145. Non-thermal production of WIMPs, cosmic  $e^\pm$  excesses and gamma-rays from the Galactic Center.  
*X.-J. Bi, R. Brandenberger, P. Gondolo, T.-J. Li, Q. Yuan, X.-M. Zhang*  
Physical Review D80 (2009) 103502.
144. Neutralino dark matter in BMSSM effective theory.  
*M. Berg, J. Edsjo, P. Gondolo, E. Lundstrom, S. Sjors*  
Journal of Cosmology and Astroparticle Physics, 8 (2009) 35.
143. Dark Stars: a new look at the first stars in the universe.  
*D. Spolyar, P. Bodenheimer, K. Freese, P. Gondolo*  
Astrophysical Journal 705 (2009) 1031.
142. Dark matter axions revisited.  
*L. Visinelli, P. Gondolo*  
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141. Compatibility of DAMA/LIBRA dark matter detection with other searches in light of new Galactic rotation velocity measurements.  
*C. Savage, K. Freese, P. Gondolo, D. Spolyar*  
Journal of Cosmology and Astroparticle Physics, 9 (2009) 36.
140. Solar neutrino limit on axions and keV-mass bosons.  
*P. Gondolo, G. Raffelt*  
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139. Compatibility of DAMA/LIBRA dark matter detection with other searches.  
*C. Savage, G. Gelmini, P. Gondolo, K. Freese*  
Journal of Cosmology and Astroparticle Physics, 4 (2009) 10.
138. Stellar structure of Dark Stars: a first phase of stellar evolution due to dark matter annihilation.  
*K. Freese, P. Bodenheimer, D. Spolyar, P. Gondolo*  
Astrophysical Journal Letters, 685 (2008) 101.
137. Dark matter in the MSSM Golden Region.  
*J. Kasahara, K. Freese, P. Gondolo*  
Physical Review D79 (2009) 045020.
136. Dark Matter Densities during the Formation of the First Stars and in Dark Stars.  
*K. Freese, P. Gondolo, J.A. Sellwood, D. Spolyar*  
Astrophysical Journal, 693 (2009) 1563 [7 pages].
135. Ultracold WIMPs: relics of non-standard pre-BBN cosmologies.  
*G.B. Gelmini, P. Gondolo*  
Journal of Cosmology and Astroparticle Physics, 10 (2008) 002.
134. Directional recoil rates for WIMP direct detection.  
*M. Alenazi, P. Gondolo*  
Physical Review D77 (2008) 043532.
133. Dark matter and the first stars: a new phase of stellar evolution.  
*D. Spolyar, K. Freese, P. Gondolo*  
Physical Review Letters 100 (2008) 051101.
132. Direct detection of neutralino dark matter in non-standard cosmologies.  
*G. Gelmini, P. Gondolo, A. Soldatenko, C.E. Yaguna*  
Physical Review D76 (2007) 015010.

131. Model independent form factors for spin independent neutralino-nucleon scattering from elastic electron scattering data.  
*G. Duda, A. Kemper, P. Gondolo*  
Journal of Cosmology and Astroparticle Physics, 04 (2007) 012 [23 pages].
130. Phase-space distribution of unbound dark matter near the Sun.  
*M. Alenazi, P. Gondolo*  
Physical Review D74 (2006) 083518 [13 pages].
129. Annual modulation of dark matter in the presence of streams.  
*C. Savage, K. Freese, P. Gondolo*  
Physical Review D74 (2006) 043531 [16 pages].
128. The effect of a late decaying scalar on the neutralino relic density.  
*G. Gelmini, P. Gondolo, A. Soldatenko, C.E. Yaguna*  
Preprint hep-ph/0605016 (May 2006) [16 pages].  
Physical Review D74 (2006) 083514 [12 pages].
127. Stellar orbit constraints on neutralino annihilation at the Galactic Center.  
*J. Hall, P. Gondolo*  
Preprint astro-ph/0602400 (February 2006) [13 pages].  
Physical Review D74 (2006) 063511 [11 pages].
126. Neutralino with the right cold dark matter abundance in (almost) any supersymmetric model.  
*G.B. Gelmini, P. Gondolo*  
Physical Review D74 (2006) 023510 [5 pages].
125. New models for a triaxial Milky Way spheroid and effect on the microlensing optical depth to the Large Magellanic Cloud.  
*C. Savage, K. Freese, P. Gondolo, H.J. Newberg*  
Journal of Cosmology and Astroparticle Physics 07 (2006) 003 [23 pages].
124. Detectability of weakly interacting massive particles in the Sagittarius dwarf tidal stream.  
*K. Freese, P. Gondolo, H.J. Newberg*  
Physical Review D71 (2005) 043516 [15 pages].
123. Compatibility of DAMA dark matter detection with other searches.  
*P. Gondolo, G. Gelmini*  
Physical Review D71 (2005) 123520 [10 pages].
122. Can WIMP spin dependent couplings explain DAMA data, in light of null results from other experiments?  
*C. Savage, P. Gondolo, K. Freese*  
Physical Review D70 (2004) 123513 [12 pages].
121. Markov Chain Monte Carlo exploration of minimal supergravity with implications for dark matter.  
*E.A. Baltz, P. Gondolo*  
Journal of High Energy Physics 10 (2004) 052 [17 pages].
120. Probing the evolution of the dark energy density with future supernova surveys.  
*Y. Wang, V. Kostov, K. Freese, J.A. Frieman, P. Gondolo*  
Journal of Cosmology and Astroparticle Physics 12 (2004) 003 [24 pages].
119. DarkSUSY: computing supersymmetric dark matter properties numerically.  
*P. Gondolo, J. Edsjö, P. Ullio, L. Bergström, M. Schelke, E.A Baltz*  
Journal of Cosmology and Astroparticle Physics 0407 (2004) 008 [35 pages].



118. Variable stars toward the bulge of M31: the AGAPE catalogue.  
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*Astronomy and Astrophysics* 421 (2004) 509 [10 pages].
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*G. Gelmini, P. Gondolo, A. Soldatenko*  
*Physical Review D* 70 (2004) 023010 [5 pages].
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*E.A. Baltz, T.R. Lauer, D.R. Zurek, P. Gondolo, M.M. Shara, J. Silk, S.E. Zepf*  
*Astrophysical Journal* 610 (2004) 691 [16 pages].
115. The effects of the Sagittarius dwarf tidal stream on dark matter detectors.  
*K. Freese, P. Gondolo, H.J. Newberg, M. Lewis*  
*Physical Review Letters* 92 (2004) 111301 [4 pages].
114. Future Type Ia supernova data as tests of dark energy from modified Friedmann equations.  
*Y. Wang, K. Freese, P. Gondolo, M. Lewis*  
*Astrophysical Journal* 594 (2003) 25 [8 pages].
113. Fluid interpretation of Cardassian expansion.  
(Original title: Dark energy as interacting dark matter with negative pressure.)  
*P. Gondolo, K. Freese*  
*Physical Review D* 68 (2003) 063509 [10 pages].
112. Accurate relic densities with neutralino, chargino and sfermion coannihilations in mSUGRA.  
*J. Edsjö, M. Schelke, P. Ullio, P. Gondolo*  
*Journal of Cosmology and Astroparticle Physics* 04 (2003) 1 [29 pages].
111. Improved constraints on supersymmetric dark matter from muon  $g-2$ .  
*E. A. Baltz, P. Gondolo*  
*Physical Review D* 67 (2003) 063503 [8 pages].
110. Measuring the prompt atmospheric neutrino flux with down-going muons in neutrino telescopes.  
*G. Gelmini, P. Gondolo, G. Varieschi*  
*Physical Review D* 67 (2003) 017301 [4 pages].
109. Indirect detection of a subdominant density component of cold dark matter.  
*G. Duda, G. Gelmini, P. Gondolo, J. Edsjö, J. Silk*  
*Physical Review D* 67 (2003) 023505 [10 pages].
108. Recoil momentum spectrum in directional dark matter detectors.  
*P. Gondolo*  
*Physical Review D* 66 (2002) 103513 [10 pages].
107. The cosmic ray positron excess and neutralino dark matter.  
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*Physical Review D* 65 (2002) 063511 [10 pages].
106. Detectability of a subdominant density component of cold dark matter.  
*G. Duda, G. Gelmini, P. Gondolo*  
*Physics Letters B* 529 (2002) 187–192 [6 pages].

105. CP-violating effects in neutralino scattering and annihilation.  
*P. Gondolo, K. Freese*  
Journal of High Energy Physics 7 (2002) 52–75 [34 pages].
104. On the direct detection of extragalactic WIMPs.  
*K. Freese, P. Gondolo, L. Stodolsky*  
Physical Review D64 (2001) 123502 [12 pages].
103. Implications of the muon anomalous magnetic moment for supersymmetric dark matter.  
*E. A. Baltz, P. Gondolo*  
Physical Review Letters 86 (2001) 5004–5007 [4 pages].
102. WIMP annual modulation with opposite phase in late-infall halo models.  
*G. Gelmini, P. Gondolo*  
Physical Review D64 (2001) 023504 [7 pages].
101. Binary events and extragalactic planets in pixel microlensing.  
*E. A. Baltz, P. Gondolo*  
Astrophysical Journal 559 (2001) 41–52 [12 pages].
100. Measurement of the gluon parton distribution function at small  $x$  with neutrino telescopes.  
*G. Gelmini, P. Gondolo, G. Varieschi*  
Physical Review D63 (2001) 036006 [14 pages].
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*P. Gondolo*  
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98. A new model-independent method for extracting spin-dependent cross section limits from dark matter searches.  
*D. R. Tovey, R. J. Gaitskell, P. Gondolo, Y. Ramachers, L. Roszkowski*  
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97. Prompt atmospheric neutrinos and muons: dependence on the gluon distribution function.  
*G. Gelmini, P. Gondolo, G. Varieschi*  
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96. Prompt atmospheric neutrinos and muons: NLO vs LO QCD predictions.  
*G. Gelmini, P. Gondolo, G. Varieschi*  
Physical Review D61 (2000) 036005 [13 pages].
95. Dark matter annihilation at the Galactic Center.  
*P. Gondolo, J. Silk*  
Physical Review Letters 83 (1999) 1719–1722 [4 pages].
94. Clumpy neutralino dark matter.  
*L. Bergström, J. Edsjö, P. Gondolo, P. Ullio*  
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 Astronomy and Astrophysics Letters 344 (1999) 49–52 [4 pages].
91. Optical depth evaluation in pixel microlensing.  
*P. Gondolo*  
 Astrophysical Journal Letters 510 (1999) 29–32 [4 pages].
90. Indirect detection of dark matter in km-size neutrino telescopes.  
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89. AGAPEROS: searches for microlensing in the LMC with the pixel method. II. Selection of possible microlensing events.  
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 Astronomy and Astrophysics 339 (1998) 658–670 [13 pages].
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86. Neutralino annihilation into two photons.  
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85. Neutralino relic density including coannihilations.  
*J. Edsjö, P. Gondolo*  
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84. Indirect neutralino detection rates in neutrino telescopes.  
*L. Bergström, J. Edsjö, P. Gondolo*  
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## RESEARCH: Seminars, Conferences, Lectures

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“Black Holes Inside and Out,” online conference, Japan, 27 September-1 October 2021.

*Direct Detection of WIMPs of Arbitrary Spin*, 16th Patras Workshop on Axions, WIMPs and WISPs, online workshop, Trieste, Italy, 14 June 2021.

“Interplay of Neutrino and Dark matter Experiments and Exotics Searches,” online workshop, South Korea, 18-19 March 2021.

*Compact Gravitational Systems with Negative Pressure*, Institute for the Physics and Mathematics of the Universe, University of Tokyo, Kashiwa, Japan, 18 December 2019.

*Dark Energy Stars*, Tokyo Institute of Technology, Tokyo, Japan, 17 December 2019.

INVITED PUBLIC LECTURE: *The Mystery of Cosmic Darkness*, University of Sydney, Australia, 3 December 2019.

“TAUP 2019,” Toyama, Japan, 9–13 September 2019.

INVITED PLENARY TALK: *Dark Energy Lumps*, “PACIFIC 2019,” Moorea, French Polynesia, 2–6 September 2019.

INVITED PLENARY TALK: *Dark Energy Lumps*, “Dark Side of the Universe,” Buenos Aires, Argentina, 15–19 July 2019.

*Dark Energy Stars*, Yukawa Institute, Kyoto University, Kyoto, Japan, 24 May 2019.

*Dark Energy Stars*, Institute for the Physics and Mathematics of the Universe, University of Tokyo, Kashiwa, Japan, 10 May 2019.

*Dark Energy Stars*, HEAP seminar, University of Utah, Salt Lake City, Utah, 27 September 2018.

INVITED PLENARY TALK: *Phenomenology of Dark Matter*, “Neutrinos and Dark Matter,” Daejeon, South Korea, 28 June–3 July 2018.

INVITED PLENARY TALK: *Dark Energy Stars*, “Dark Side of the Universe,” Annecy, France, 25–29 June 2018.

INVITED PLENARY TALK: *Toward minimal assumptions for WIMP dark matter*, “Preparing for Dark Matter Particle Discoveries,” Gothenburg, Sweden, 11–15 June 2018.

*Dark Energy Stars*, Fudan University, Shanghai, China, 23 May 2018.

*Dark Energy Stars*, Yukawa Institute of Theoretical Physics, Kyoto University, Kyoto, Japan, May 2018.

INVITED PLENARY TALK: *WIMP Dark Matter*, “New Frontiers in Cosmology,” Singapore, 5-9 Mar 2018.

INVITED PLENARY TALK: *The halo-independent approach as problem of moments*, “UCLA Dark Matter 2018,” Los Angeles, California, 21-23 Feb 2018.

INVITED TALK: *Dark Energy Stars*, “PACIFIC 2018,” Akaigawa, Japan, 12–16 Feb 2018.

“Cosmology and Particle Astrophysics (COSPA 2017),” Kyoto, Japan, 10–16 Dec 2017.

*The halo-independent approach as a problem of moments*, Institute of Basic Sciences, Daejeon, South Korea, 4–9 Dec 2017.

INVITED TALK: *Relic density calculation*, “TOOLS 2017,” Corfu, Greece, 9–13 Sep 2017.

INVITED TALK: *Toward minimal assumptions for WIMP dark matter*, Galileo Galilei Institute, 6 Sep 2017.

*Inflation and dark energy without inflaton or scalar fields*, Yukawa Institute of Theoretical Physics, Kyoto University, Kyoto, Japan, 28 July 2017.

INVITED TALK: *A new halo-independent approach and the DAMA unmodulated signal*, “Dark Side of the

Universe," Daejeon, South Korea, 10–14 July 2017.

INVITED LECTURES: *Dark matter* (2 lectures), "Rudjer Bojkovich Summer School," Zagreb, Croatia, 26–30 June 2017.

*Inverted dipole and beyond*, "CYGNUS 2017," Xichang, Sichuan, China, 13–16 June 2017.

INVITED REVIEW TALK: *Overview of dark matter*, "Candles of Darkness," Bengaluru, India, 5–9 June 2017.

INVITED TALK: *The halo-independent approach as a problem of moments*, "Axions, WIMPs, and WISPs (PATRAS)," Thessaloniki, Greece, 15–19 May 2017.

*Toward minimal assumptions for WIMP dark matter*, Max Planck Institute for Physics, Munich, Germany, 18 Jan 2017.

INVITED TALK: *Model-independent methods for direct detection*, "Astro-, Particle and Nuclear Physics of Dark Matter Direct Detection," Garching, Germany, 6–8 March 2017.

*Toward minimal assumptions for WIMP dark matter*, University of Santiago, Santiago, Chile, 14 March 2017.

INVITED REVIEW TALK: *WIMP dark matter*, "Physics in LHC and the Early Universe," Tokyo, Japan, 9–1 Jan 2017.

*Toward minimal assumptions for WIMP dark matter*, Nagoya University, Nagoya, Japan, 15 Dec 2016.

INVITED REVIEW TALK: *Dark matter theory*, "Cosmology and Particle Astrophysics (CosPA 2016)," Sydney, Australia, 28 Nov–2 Dec 2016.

INVITED PLENARY TALK: *Dark matter direct detection and quark/gluon currents in the nucleon*, "Hadronic Contributions to New Physics Searches," Tenerife, Spain, 25–30 Sept 2016.

INVITED REVIEW TALK: *Evidence for dark matter*, "Dark Side of the Universe (DSU 2016)," Bergen, Norway, 25–29 July 2016.

INVITED PLENARY TALK: *Toward minimal assumptions for WIMP dark matter*, "Identification of Dark Matter (IDM 2016)," Sheffield, England, 18–22 July 2016.

INVITED REVIEW TALK: *Dark matter detection: phenomenology*, "Particles, Strings, and Cosmology (PASCOS 2016)," Quy Nhon, Vietnam, 10–16 July 2016.

INVITED PLENARY TALK: *WIMP direct detection: toward a minimal set of assumptions*, "Axions, WIMPs, and WISPs," Jeju Island, South Korea, 20–24 June 2016.

*Toward minimal assumptions for WIMP dark matter*, Yukawa Institute of Theoretical Physics, Kyoto University, Kyoto, Japan, 6 June 2016.

INVITED REVIEW TALK: *WIMP Dark Matter*, "APS April Meeting," Salt Lake City, Utah, 16–19 Apr 2016.

INVITED REVIEW TALK: *Dark matter particle candidates*, "Sources and Detection of Dark Matter and Dark Energy in the Universe," Los Angeles, California, 17–19 Feb 2016.

INVITED PLENARY TALK: *Halo-independent analysis of direct dark matter experiments*, "Dark Side of the Universe (DSU2016)," Kyoto, Japan, 14–18 Dec 2015.

INVITED TALK: *Trends in dark matter physics*, "Everything about gravity," Taipei, Taiwan, 14–18 Dec 2015.

*Dark matter searches: a theorist's perspective*, Korean Institute for Advanced Studies, Seoul, South Korea, 9 Dec 2015.

*Dark matter searches: a theorist's perspective*, Institute of Basic Sciences, Daejeon, South Korea, 7 Dec 2015.

*Direct dark matter searches: a theorist's perspective*, India Association for the Cultivation of Science, Kolkata, India, 28 Oct 2015.

INVITED PLENARY TALK: *Trends in dark matter physics*, "Advances in Astroparticle Physics and Cosmology (AAPCOS) 2015," Kolkata, India, 12–17 Oct 2015.

INVITED LECTURES: *Dark matter theory* (2 lectures), "Advances in Astroparticle Physics and Cosmology (AAPCOS) 2015," Kolkata, India, 12–17 Oct 2015.

INVITED PLENARY TALK: *Theoretical trends in WIMP direct detection*, "Particle Astrophysics and Cosmology Including Fundamental Interactions (PACIFIC) 2015," Moorea, French Polynesia, 12–18 Sept 2015.

INVITED PLENARY TALK: *An assessment of the WIMP dark matter paradigm and its alternatives*, "Topics in Astroparticle and Underground Physics (TAUP) 2015," Torino, Italy, 7–11 Sept 2015.

*Astrophysics-independent method for direct dark matter searches*, "Particle Astrophysics and Cosmology (PASCOS) 2015," Trieste, Italy, 29 June–3 July 2015.

INVITED PLENARY TALK: *Dark matter (astro)physics: a theorist's perspective*, "Invisibles meets Visibles," Madrid, Spain, 22–26 June 2015.

INVITED PLENARY TALK: *Trends in dark matter physics*, "International Workshop on Weak Interactions and Neutrinos (WIN2015)," Heidelberg, Germany, 8–13 June 2015.

INVITED REVIEW TALK: *Dark matter theory*, "2015: The Spacetime Odyssey continues," Stockholm, Sweden, 2–5 June 2015.

INVITED PLENARY TALK: *Direct dark matter searches: a theorist's perspective*, "Conference on Science at the Sanford Underground Research Facility," Rapid City, South Dakota, 18–20 May 2015.

COLLOQUIUM: *Direct dark matter searches: status and implications*, Fermilab, Batavia, 1 Apr 2015.

INVITED TALK: *WIMP direct detection: status and implications*, "Dark Side of the Universe," Cape Town, South Africa, 17–21 Nov 2014.

INVITED PLENARY TALK: *Dark Matter*, "Recent Progress in Physics," Suwon, South Korea, 5–7 Nov 2014.

INVITED PLENARY TALK: *Direct dark matter searches: status and implications*, "Particle Physics and Cosmology," Seoul, South Korea, 27–31 Oct 2014.

INVITED PLENARY TALK: *Trends in WIMP direct detection*, "WIMPs and axions," Daejeon, South Korea, 10–21 Oct 2014.

INVITED LECTURES: *Theory and phenomenology of dark matter* (3 lectures), "Gran Sasso Summer Institute," Assergi, Italy, 22 Sept–3 Oct 2014.

INVITED PLENARY TALK: *Introduction to dark matter*, "Very High Energy Phenomena in the Universe," Quy Nhon, Vietnam, 3–9 Aug 2014.

INVITED TALK: *Dark matter searches: status and implications*, "International Conference on High Energy Physics (ICHEP)," Valencia, Spain, 2–9 July 2014.

INVITED PLENARY TALK: *Direct WIMP searches: an overview*, "Axions, WIMPs, and WISPs," Geneva, Switzerland, 29 June–4 July 2014.

INVITED TALK: *Limits on light WIMPs: LUX, lite, and beyond*, "Astroparticle Physics," Amsterdam, MA, 23–28 July 2014.

*Toward a realistic model of quarks and leptons*, "Neutrino Physics and Astrophysics," Boston, MA, 2–7 June 2014.

INVITED PLENARY TALK: *Review of evidence for dark matter*, "Latest Results in Dark Matter Searches," Stockholm, Sweden, 12–14 May 2014.

"What is the Dark Matter?" Stockholm, Sweden, 5–30 May 2014.

COLLOQUIUM: *Particle dark matter*, University of Kansas, Kansas, 25 March 2014.

"Dark matter 2014," Los Angeles, CA, 26–28 February 2014.

INVITED PLENARY TALK: *Dark Matter*, Meeting of the Four Corners Section of the American Physical Society, Denver, CO, 18–19 October 2013.

*Astrophysics independent analysis of direct detection data*, "Dark Side of the Universe 2013," Trieste, Italy, 14–17 October 2013.

INVITED TALK: *Update on dark matter WIMPs*, "Future of Dark Matter Particle Astrophysics," Trieste, Italy, 8–11 October 2013.

INVITED TALK: *Astrophysics independent analysis of direct detection data*, "Particle Astrophysics and Cosmology Including Fundamental Interactions (PACIFIC) 2013," Moorea, French Polynesia, 2–6 September 2013.

*Astrophysics independent analysis of direct detection data*, "TeV Particle Astrophysics (TeVPA) 2013," Irvine, CA, 26–29 October 2013.

INVITED LECTURES: *Particle physics models for dark matter*, series of three lectures delivered at the International School of Astroparticle Physics (ISAPP2013) "Dark Matter Composition and Detection," Djurönäset, Sweden, 29 July–6 August 2013.

*A spontaneously-broken  $A_4$  symmetry for neutrino masses and mixings*, "CETUP Program on Neutrino Physics and Astrophysics," Lead, SD, 15–26 July 2013.

INVITED TALK: *Light Dark Matter*, "VIIIth International Conference on Interconnections between Particle Physics and Cosmology (PPC2013)," Deadwood, SD, 8–13 July 2013.

*Halo-Independent analysis of light dark matter*, "CETUP Program on Dark Matter," Lead, SD, 24 June–26 July 2013.

INVITED TALK: *WIMP dark matter & halo-independent analysis of direct detection data*, "9th Patras Workshop on Axions, WIMPs and WISPs," Mainz, Germany, 24–28 June 2013.

*Dark Matter: Status and Prospects*, "Beyond the Standard Model after the first run of the LHC," Firenze, Italy, 6 June 2013.

INVITED TALK: *Light Dark Matter*, "Carolina International Symposium on Nuclear Physics," Columbia, SC, 20–22 May 2013.

*Light Thermal WIMPs*, "Light Dark Matter: Asymmetric, thermal and non-thermal dark matter and its detection," Ann Arbor, MI, 15–17 April 2013.

*Dark Matter and Nuclear Physics*, Dept. of Nuclear Engineering, University of Utah, 10 April 2013.

PUBLIC LECTURE: *Particle Perspectives on Dark Matter*, University of Utah, 8 April 2013.

COLLOQUIUM: *Challenges and Uncertainties in Particle Dark Matter Theory*, Ohio State University, Columbus, Ohio, 19 March 2013.

INVITED TALK: *Wanted! Nuclear Data for Dark Matter Astrophysics*, "Nuclear Data for Science and Technology (ND2013)," New York, NY, 4–9 March 2013.

*On the Kinetic Decoupling of WIMPs*, Brookhaven National Laboratory, Upton, NY, 20 February 2013.

*On the Kinetic Decoupling of WIMPs*, "TeV Particle Astrophysics (TeVPA) 2012," Mumbai, 10–14 December 2012.

*Dark Matter Candidates*, Sogang University, Seoul, South Korea, 9 October 2012.

INVITED REVIEW TALK: *Dark Matter Candidates*, "COSMO 2012," Beijing, China, 10–14 September 2012.

*Phenomenology of Low-Mass WIMPs*, "Identification of Dark Matter (IDM)," Chicago, IL, 23–27 July 2012.

INVITED REVIEW TALK: *Phenomenology of Direct WIMP Detection*, "Axion, WIMPs, and WISPs," Chicago, IL,

18–21 July 2012.

INVITED REVIEW TALK: *Challenges and Uncertainties in Dark Matter Theory*, "Dark Matter Jubilee," Richmond, WA, 19–21 June 2012.

INVITED REVIEW TALK: *Direct Detection of Dark Matter*, "Nuclear Physics and Dark Matter," Nara, Japan, 11–15 June 2012.

INVITED REVIEW TALK: *Direct Detection of Dark Matter*, "PASCOS 2012," Mérida, Mexico, 4–8 June 2012.

*Collider Bounds on the First Dark Halos*, Seoul National University, Seoul, South Korea, 10 May 2012.

*Axion dark matter in non-standard cosmologies*, "Axion Roadmap to 2025," Institute of Nuclear Theory, University of Washington, 23–27 April 2012.

INVITED REVIEW TALK: *Theories of dark matter*, "Sources and Identification of Dark Matter," Marina del Rey, February 2012.

LECTURES: *Particle dark matter*, series of four lectures delivered at the Korean Institute of Advanced Science (KIAS), 6–9 February 2012.

*Direct Detection of Dark Matter: A Theorist's Perspective*, Nagoya, Japan, 16–20 December 2011.

*Dark stars, or how dark matter can make a star shine*, Uppsala University, Uppsala, Sweden, 24 November 2011.

*Dark stars, or how dark matter can make a star shine*, "Bethe Forum on LHC, Dark Matter, and Unification," Bonn, Germany, 17 November 2011.

INVITED TALK: *Dark matter Overview*, "Gamma-Ray Universe: Fermi to CTA," Tsukuba, Japan, 14 November 2011.

*Dark stars, or how dark matter can make a star shine*, Fudan University, Shanghai, China, 17 October 2011.

*Direct dark matter detection*, "Dark Matter and New Physics," KITPC, Beijing, China, 14 October 2011.

INVITED TALK: *Dark stars: how dark matter can make a star shine*, "Dark Side of the Universe 2011," Beijing, China, 30 September 2011.

INVITED TALK: *Direct dark matter detection*, "IceCube collaboration meeting," Uppsala, Sweden, 23 September 2011.

INVITED TALK: *Dark stars, or how dark matter can make a star shine*, "Particle Astrophysics and Cosmology Including Fundamental Interactions (PACIFIC) 2011" Moorea, French Polynesia, 11 September 2011.

INVITED PLENARY TALK: *Overview of direct dark matter detection*, "TeV Particle Astrophysics," Stockholm, Sweden, 3 August 2011.

INVITED TALK: *Channeling in dark matter detection*, "Dark Matter from Every Direction," McGill University, Montreal, Canada, 1 April 2011.

*Channeling in dark matter detection*, "SnowPAC 2011," Snowbird, Utah, 31 January 2011.

*Dark matter in galaxies*, one of the 138 seminars of the worldwide Dark Matter Awareness Week 2010, coordinated by P. Salucci (SISSA): 7 December 2010.

INVITED TALK: *Channeling in dark matter detection*, "Dark matter: direct detection and theoretical development," Princeton Center for Theoretical Science, Princeton, New Jersey, 15 November 2010.

INVITED TALK: *Axion cold dark matter in standard and non-standard cosmologies*, "Non-Thermal Cosmological Histories of the Universe Workshop," University of Michigan, Ann Arbor, Michigan, 19 October 2010.

*Channeling in dark matter detection*, SISSA, Trieste, Italy, 13 October 2010.

INVITED TALK: *Cold Dark Matter*, "String Theory and Cosmology," Daejeon, South Korea, 2 October 2010.



*Channeling in dark matter detection*, Fermilab, Batavia, Illinois, 13 September 2010.

*Cold Dark Matter*, Asian-Pacific Center for Theoretical Physics, Seoul, South Korea, 19 August 2010.

PANELIST: *Dark Matter*, "Hector Rubinstein Memorial Symposium on Quarks, Strings, and the Cosmos," Stockholm, Sweden, 9–11 August 2010.

*Cold Dark Matter*, Konkuk University, Seoul, South Korea, 20 July 2010.

*Axions cold dark matter in standard and non-standard cosmologies*, Korean Institute for Advanced Studies, Seoul, South Korea, 13 July 2010.

*Cold Dark Matter*, Seoul National University, Seoul, South Korea, 1 July 2010.

INVITED TALK: *Dark Stars*, "Nordic Astrophysics 2010," Visby, Sweden, 25–28 May 2010.

INVITED TALK: *Axions cold dark matter in standard and non-standard cosmologies*, "Dark Matter: Its Nature, Origin, and Prospects for Detection," Florence, Italy, 17–21 May 2010.

*News on dark stars*, University of Chicago, 5 May 2010.

INVITED TALK: *Channeling in direct dark matter detection*, "Light Dark Matter," Davis, California, 30 April 2010.

*Dark Stars, or how Dark Matter can make a Star shine*, Sogang University, 24 March 2010.

*Axion Cold Dark Matter in Standard and Non-Standard Cosmologies*, Korean Institute of Advanced Studies (KIAS), 19 March 2010.

COLLOQUIUM: *Dark Stars, or how Dark Matter can make a Star shine*, Seoul National University, 17 March 2010.

INVITED REVIEW TALK: *Dark Stars*, "Sources and Detection of Dark Matter and Dark Energy in the Universe," Marina del Rey, California, 24–26 Feb 2010.

INVITED TALK: *Axion Cold Dark Matter in Standard and Non-Standard Cosmologies*, "Cosmic Rays as Background to Dark Matter Detection," Stockholm, Sweden, 25–27 January 2010.

INVITED TALK: *Axion Cold Dark Matter in Standard and Non-Standard Cosmologies*, "Axions 2010," Gainesville, Florida, 15–17 January 2010.

INVITED PLENARY TALK: *Dark Stars, or how Dark Matter can make a Star shine*, "Miami 2009," Miami, Florida, 14–18 December 2009.

INVITED PLENARY TALK: *Dark Stars, or how Dark Matter can make a Star shine*, "Focus Workshop on Indirect Dark Matter Searches," Tokyo, Japan, 7–11 December 2009.

INVITED REVIEW TALK: *Introduction to Dark Stars*, "Dark Stars," Ann Arbor, Michigan, 8–11 November 2009.

*The Effect of Dark Matter on the First Stars*, Northwestern University, Evanston, Illinois, 29 September 2009.

*Channeling in Dark Matter Detection*, Seoul National University, Seoul, Korea, 7 September 2009.

INVITED PLENARY TALK: *Dark Stars, or the Effect of Dark Matter on the First Stars*, "Dark Matter, LHC, and Cosmology," Seoul, Korea, 27 July–4 August 2009.

INVITED LECTURES: *Particle Dark Matter* (4 lectures), "Vietnam School of Physics," Dong Hoi, Vietnam, 24–31 July 2009.

INVITED LECTURES: *Dark Matter* (3 lectures), "Recent Developments in Neutrino Physics and Astroparticle Physics," Pohang, Korea, 17–25 June 2009.

INVITED REVIEW TALK: *Dark Matter and PAMELA, ATIC, Fermi, ....*, "Recent Developments in Neutrino Physics and Astroparticle Physics," Pohang, Korea, 17–25 June 2009.

INVITED PLENARY TALK: *Directional Modulation in Crystalline Detectors*, "Cygnus 2009," MIT, Boston, 11–13 June 2009.

INVITED REVIEW TALK: *Dark Matter Overview*, opening talk at "Particle Physics and Cosmology 2009," University of Oklahoma, Norman, Oklahoma, 18–22 May 2009.

*Dark Stars, or the Effect of Dark Matter on the First Stars*, University of Chicago, Chicago, Illinois, 22 April 2009.

COLLOQUIUM: *Dark Matter*, Arizona State University, Tempe, Arizona, 31 March 2009.

INVITED REVIEW TALK: *WIMPs as Dark Matter*, "Connecting Fundamental Physics with Observations," Beijing, China, 9–27 March 2009.

INVITED PLENARY TALK: *Dark Stars, or the Effect of Dark Matter on the First Stars*, "Connecting Fundamental Physics with Observations," Beijing, China, 9–27 March 2009.

*WIMPs as Dark Matter*, Beijing Normal University, Beijing, China, 23 March 2009.

INVITED PLENARY TALK: *LHC, Dark Matter, and Non-Standard Cosmologies*, "LHC and Dark Matter Workshop," Ann Arbor, Michigan, 6-10 January 2009.

*Dark Matter and the First Stars*, Harvard University, Boston, Massachusetts, 5 November 2008.

*WIMP astrophysics*, Massachusetts Institute of Technology, Boston, Massachusetts, 4 November 2008.

*Dark Matter and the First Stars*, Texas A & M University, College Station, Texas, 28 October 2008.

*Dark Matter and the First Stars*, Rice University, Houston, Texas, 15 October 2008.

INVITED LECTURES: *WIMPs as dark matter*, "Dark Matter at the Crossroads," DESY, Hamburg, 29 September–2 October 2008.

*Dark Matter and the First Stars*, Kavli Institute for Theoretical Physics China (KITPC), Beijing, China, 1 October 2008.

INVITED REVIEW TALK: *Dark Matter*, "TeV Particle Astrophysics," Beijing, China, 21–27 September 2008.

*Dark Matter and the First Stars*, "TeV Particle Astrophysics," Beijing, China, 21-27 September 2008.

*Dark Matter and the First Stars*, University of New Mexico, Albuquerque, New Mexico, 9 September 2008.

INVITED REVIEW TALK: *Summary Talk*, "Identification of Dark Matter 2008," Stockholm, Sweden, 11–18 August 2008.

*Dark Matter and the First Stars*, "Identification of Dark Matter 2008," Stockholm, Sweden, 11-18 August 2008.

INVITED PLENARY TALK: *Dark Stars*, "Santa Fe Cosmology Summer Workshop," Santa Fe, New Mexico, 14–18 July 2008.

INVITED REVIEW TALK: *Dark Matter*, "Tools for the New Physics and its Background 2008," Munich, Germany, 30 June–4 July 2008.

INVITED LECTURES: *Introduction to Dark Matter for Graduate Students*, (2 lectures) "The Dark Side of the Universe, Part II," University of Michigan, Ann Arbor, 17 May–14 June 2008.

INVITED PLENARY TALK: *Dark Matter and the First Stars*, "Small Scale Structure of Dark Matter," Perimeter Institute, Waterloo, Canada, 6–8 June 2008.

INVITED PLENARY TALK: *Dark Matter and Non-Standard Cosmologies*, "Interconnection between Particle Physics and Cosmology," Albuquerque, New Mexico, 19–23 May 2008.

*Dark stars*, University of Florida, 11 Apr 2008.

INVITED PLENARY TALK: *WIMP Astronomy*, "DUSEL Theory Workshop," Columbus, Ohio, 3–5 April 2008.

INVITED LECTURES: *Dark Matter Physics* (3 lectures), "21st Spring School on Particles and Fields," National Chiao-Tung University, Taiwan, 31 March–3 April 2008.

INVITED PLENARY TALK: *Directional Recoil Rates for WIMP Direct Detection*, "Sources and Detection of Dark

Matter and Dark Energy in the Universe," Marina del Rey, California, 20–22 February 2008.

*An Optical/Infrared Observatory in Southern Utah*, "Astrophysics in the Next Decade," Tucson, Arizona, 24–27 September 2007 [poster].

INVITED PLENARY TALK: *Particle dark matter and the Universe before nucleosynthesis*, "SF06 Cosmology Summer Workshop," Santa Fe, 3–21 July 2006.

INVITED PLENARY TALK: *DarkSUSY*, "Tools for SUSY 2006," Annecy, France, 26–28 June 2006.

INVITED PLENARY TALK: *Particle dark matter and non-standard cosmology*, "Complementarity between Dark Matter Searches and Collider Experiments," Irvine, California, 10–11 June 2006.

INVITED REVIEW TALK: *Physics of the Early Universe: What Can We Learn from Cosmological Observations?* "CMB and the Physics of the Early Universe," Ischia, Italy, 20–22 April 2006.

INVITED REVIEW TALK: *Cosmology-theoretical perspective*, "Complementarity between Dark Matter Searches and Collider Experiments," Marina del Rey, 25 February 2006.

INVITED PLENARY TALK: *Right neutralino cold dark matter abundance in (almost) any supersymmetric model*, "Sources and Detection of Dark Matter and Dark Energy in the Universe," Marina del Rey, California, 22–24 February 2006.

COLLOQUIUM: *Most of the Universe is not like us*, University of Utah, Salt Lake City, Utah, September 2005.

INVITED REVIEW TALK: *Weakly Interacting Dark Matter*, "Current Topics in Astroparticle Physics," Ringberg Castle, Germany, 25–29 April 2005.

INVITED REVIEW TALK: *Dark Matter, Dark Energy*, "Underground Science," Seattle, Washington, 7 July 2005.

INVITED PLENARY TALK: *Are we seeing WIMPs everywhere?* "Miami 2004," Key Biscayne, Florida, 16–19 December 2004.

COLLOQUIUM: *Most of the Universe is not like us*, Brigham Young University, Provo, Utah, 26 October 2004.

INVITED PLENARY TALK: *How can we make sure we detect dark matter?* "Dark matter in astro and particle physics (DARK 2004)," College Station, TX, 6–9 October 2004.

INVITED REVIEW TALK: *Dark Matter*, "SF04 Cosmology Summer Workshop," Santa Fe, New Mexico, July 2004.

*Mapping the WMAP mSUGRA region*, "Supersymmetry and unification of fundamental interactions," Tsukuba, Japan, 7–23 July 2004.

INVITED PLENARY TALK: *A dark matter stream through the solar neighborhood*, "The Dark Side of the Universe," University of Michigan, Ann Arbor, MI, 9–29 May 2004.

INVITED PLENARY TALK: *A dark matter stream through the solar neighborhood*, "Sources and detection of dark matter and dark energy in the Universe," Santa Monica, California, 10–28 February 2004.

INVITED PLENARY TALK: *DarkSUSY: neutralino dark matter made easy*, "Sources and detection of dark matter and dark energy in the Universe," Santa Monica, California, 10–28 February 2004.

*The neutralino relic density*, "Next Linear Collider workshop", SLAC, Menlo Park, California, 6–10 January 2004.

INVITED LECTURES: *Detection of Dark Matter* (2 lectures), NATO Advanced Study Institute "Frontiers of the Universe," Cargèse, France, 8–20 September 2003.

INVITED PLENARY TALK: *WIMP signals from dark halo substructure*, "Great Lakes Cosmology VII," Ann Arbor, Michigan, 15–17 May 2003.

*The neutralino relic density*, Los Alamos National Laboratory, Los Alamos, 29 Apr 2003.

*In quest of dark matter*, Pennsylvania State University, University Park, Pennsylvania, 21 Apr 2003.

- INVITED REVIEW TALK: *The Current Astrophysical and Experimental Picture of Dark Matter*, APS April Meeting, Philadelphia, Pennsylvania, 5-8 Apr 2003.
- COLLOQUIUM: *Particle physics with cosmic rays*, University of Utah, Salt Lake City, Utah, 28 Mar 2003.
- COLLOQUIUM: *Particle physics with cosmic rays*, University of Arizona, Tucson, Arizona, 20 Jan 2003.
- In Quest of Dark Matter*, Los Alamos National Laboratory, Los Alamos, 27 Apr 2003.
- COLLOQUIUM: *In Quest of Dark Matter*, Tulane University, New Orleans, Louisiana, 13 Mar 2003.
- COLLOQUIUM: *In Quest of Dark Matter*, Michigan Technological University, Houghton, Michigan, 24 Feb 2003.
- COLLOQUIUM: *In Quest of Dark Matter*, University of North Carolina, Chapel Hill, North Carolina, 20 Feb 2003.
- Cornering supersymmetry between now and the LHC*, University of Arizona, Tucson, Arizona, 19 Jan 2003.
- COLLOQUIUM: *In Quest of Dark Matter*, SUNY at Buffalo, Buffalo, New York, 5 Dec 2002.
- COLLOQUIUM: *In Quest of Dark Matter*, University of California, Santa Cruz, California, 24 Oct 2002.
- INVITED REVIEW TALK: *Neutrinos from WIMPs*, NSF Meeting on "Neutrinos and Subterranean Science," Washington, D.C., 19-21 Sept 2002.
- INVITED PLENARY TALK: *WIMP dark matter signals from substructure in the halo*, "The New Cosmology Confronts Observation," Santa Barbara, California, 19–23 Aug 2002.
- INVITED PLENARY TALK: *Methods to detect WIMP streams and clouds in the halo*, "Predictions of Cold Dark Matter models on small scales: current and future tests," Chicago, Illinois, 31 Jul–2 Aug 2002.
- COLLOQUIUM: *Astroparticle physics of dark matter*, University of Pittsburgh, Pennsylvania, 26 March 2002.
- Dark halo substructure and WIMP signals*, Yukawa Institute of Theoretical Physics, Kyoto, Japan, 6 March 2002.
- INVITED PLENARY TALK: *Dark halo (sub)structure and WIMP signals*, "Sources and Detection of Dark Matter and Dark Energy in the Universe," Marina del Rey, California, 20–22 Feb 2002.
- Dark halo substructure and WIMP signals*, Washington University in St. Louis, St. Louis, Missouri, 14 Feb 2002.
- COLLOQUIUM: *Astroparticle physics of dark matter*, Washington University in St. Louis, St. Louis, Missouri, 13 Feb 2002.
- Dark matter around black holes*, Case Western Reserve University, Cleveland, Ohio, 2 Oct 2001.
- INVITED PLENARY TALK: *WIMPs and cusps*, "SF01 Cosmology Summer Workshop," Santa Fe, New Mexico, July 2001.
- INVITED REVIEW TALK: *Dark Matter and Particle Physics*, "The Future of Particle Physics," Snowmass, Colorado, July 2001.
- INVITED PLENARY TALK: *WIMPs and cusps*, "Structure Formation and Dark Matter Halos," Chicago, Illinois, 10–12 May 2001.
- Neutralino dark matter is dead, unless....*, University of Michigan, Ann Arbor, Michigan, Jan 2001.
- Neutralino dark matter is dead, unless....*, University of Florida, Gainesville, Florida, 1 Dec 2000.
- INVITED REVIEW TALK: *Indirect Dark Matter Searches*, "Neutrino 2000," Sudbury, Canada, 16–21 June 2000.
- Measuring the small- $x$  gluon density with neutrino telescopes*, University of Dortmund, Dortmund, Germany, 8 June 2000.
- Neutralino dark matter is dead, unless....*, CERN, Geneva, Switzerland, 18 May 2000.

- The mystery of the missing mass*, Temple University, Philadelphia, Pennsylvania, 13 Apr 2000.
- Neutralino dark matter is dead, unless....*, Lawrence Berkeley National Laboratory, Berkeley, California, 28 Feb 2000.
- INVITED PLENARY TALK: *Neutralino dark matter vs galaxy formation*, "Sources and Detection of Dark Matter," Marina del Rey, California, 23–25 Feb 2000.
- WIMP dark matter or cuspy dark halos?* Fermilab, Batavia, Illinois, 14 Feb 2000.
- The mystery of the missing mass*, Colloquium, University of South Carolina, Columbia, South Carolina, 4 Feb 2000.
- INVITED PLENARY TALK: *Dark matter at the center of the Galaxy*, "COSMO 99," Trieste, Italy, 27 Sept–2 Oct 1999.
- INVITED PLENARY TALK: *Dark matter at the galactic center*, "TAUP 99," Paris, France, 5-11 Sept 1999.
- INVITED PLENARY TALK: *DarkSUSY*, "Tools for Dark Matter 99," CERN, Geneva, 2–6 Aug 1999.
- INVITED REVIEW TALK: *Supersymmetric dark matter*, "IHEP Workshop on Astroparticle Physics," Beijing, China, 24–26 May 1999.
- Status of pixel microlensing searches*, Beijing Astronomical Observatory, Beijing, China, 26 May 1999.
- INVITED PLENARY TALK: *DarkSUSY*, "Tools for SUSY 99," Lyon, France, 31 March–2 Apr 1999.
- New clues on dark matter*, University of Washington, Seattle, Washington, 1 December 1998.
- New clues on dark matter*, University of Notre Dame, Notre Dame, Indiana, 24 November 1998.
- New clues on dark matter*, University of Michigan, Ann Arbor, Michigan, 20 November 1998.
- COLLOQUIUM: *What makes galaxies so heavy?* Munich Technical University, Garching, Germany, 5 November 1998.
- Explaining the galactic gamma-ray halo with dark matter annihilations*, Collège de France, Paris, 22 October 1998.
- INVITED PLENARY TALK: *New clues on dark matter*, "Trends in Theoretical Physics," Ringberg Castle, Tegernsee, Germany, 12–16 October 1998.
- INVITED PLENARY TALK: *Dark matter annihilations and the gamma-ray halo*, "Dark Matter in Astro and Particle Physics," Heidelberg, Germany, 20–25 July 1998.
- INVITED PLENARY TALK: *Evidence for sterile–neutrino dark matter?* "New Trends in Neutrino Physics," Ringberg Castle, Tegernsee, Germany, 24–29 May 1998.
- INVITED PLENARY TALK: *Bounds on R-parity violation from cosmic ray antiprotons*, "Lepton and Baryon Number Violation," Trento, Italy, 20–25 Apr 1998.
- INVITED PLENARY TALK: *Bounds on R-parity violation from antiprotons in cosmic rays*, "Particles, Strings, and Cosmology (PASCOS-98)," Boston, Massachusetts, 23–29 March 1998.
- From pixel microlensing data to physical quantities: the optical depth*, Center for Particle Astrophysics, Berkeley, California, 11 March 1998.
- Accurate relic densities of neutralinos*, Lawrence Berkeley Laboratory, Berkeley, California, 2 March 1998.
- From pixel microlensing data to physical quantities: the optical depth*, University of California, Los Angeles, California, 25 Feb 1998.
- INVITED PLENARY TALK: *Accurate relic densities of neutralinos*, "Dark Matter 98," Marina del Rey, California, 18–20 Feb 1998.
- INVITED PLENARY TALK: *Optical depth determination in pixel microlensing*, "4th International Workshop on

Gravitational Microlensing Surveys," Paris, France, 15–17 Jan 1998.

INVITED PLENARY TALK: *Cosmic rays and cosmic relics: new bounds on supersymmetry*, "Highlights in Astroparticle Physics," ICTP, Trieste, Italy, 7–14 Dec 1997.

INVITED PLENARY TALK: *Atmospheric muon and neutrino fluxes above 1 TeV*, "Neutrino Astrophysics," Ringberg Castle, Tegernsee, Germany, 20–24 Oct 1997.

*Neutralino relic density including coannihilations*, "Topics in Astroparticle and Underground Physics 97," Laboratori Nazionali del Gran Sasso, Italy, 7–11 Sept 1997.

INVITED PLENARY TALK: *Neutralino relic density including coannihilations*, "Non-Accelerator New Physics 97," Dubna, Russia, 7–11 July 1997.

*Limits on R-parity breaking from cosmic ray antiprotons*, Collège de France, Paris, France, 24 June 1997.

*Limits on R-parity breaking from cosmic ray antiprotons*, Institut d'Astrophysique, Paris, France, 19 June 1997.

*Dark matter searches: from WIMPs to MACHOs*, University of California, Davis, California, 5 Dec 1996.

*The nature of galactic dark halos*, Theory Division, CERN, Geneva, Switzerland, 18 July 1996.

INVITED PLENARY TALK: *AGAPE: a gravitational microlensing search for dark matter by monitoring pixels*, "Dark Matter 96," Sesto Pusteria, Italy, 2–5 July 1996.

*The AGAPE Project: studying Andromeda with microlensing*, University of California, Los Angeles, California, 13 June 1996.

*The AGAPE search for gravitational microlensing towards M31*, University of California, San Diego, California, 18 June 1996.

*The AGAPE search for gravitational microlensing towards M31*, Center for Particle Astrophysics, Berkeley, California, 11 June 1996.

*Indirect detection of neutralino dark matter*, "High Energy Neutrino Astrophysics," Aspen, Colorado, 26 May–9 June 1996.

*Atmospheric muons and neutrinos from charm*, "High Energy Neutrino Astrophysics," Aspen, Colorado, 26 May–9 June 1996.

*Detection of supersymmetric dark matter*, "Nordita/Uppsala Astroparticle Physics Programme," Uppsala, Sweden, 13–24 May 1996.

*The AGAPE search for MACHOs towards M31*, Oxford University, UK, 6 May 1996.

*The AGAPE search for MACHOs towards M31*, LAPP, Annecy, France, 21 March 1996.

INVITED PLENARY TALK: *First results from AGAPE*, "Gravitational Microlensing Surveys," Orsay, France, 29–31 Jan 1996.

INVITED PLENARY TALK: *Phenomenological introduction to direct dark matter detection*, "Dark Matter in Cosmology, Quantum Measurements, Experimental Gravitation," XXXI Rencontres de Moriond, Les Arcs, France, 20–27 Jan 1996.

*Limits on direct detection of neutralino dark matter from  $b \rightarrow s\gamma$* , Oxford University, UK, Dec 1995.

INVITED PLENARY TALK: *Atmospheric muons and neutrinos from charm*, "TAUP 95," Toledo, Spain, 17–21 Sept 1995.

INVITED PLENARY TALK: *Direct detection of neutralino dark matter and  $b \rightarrow s\gamma$  decays*, "TAUP 95," Toledo, Spain, 17–21 Sept 1995.

INVITED PLENARY TALK: *The AGAPE search for MACHOs towards M31*, "TAN Meeting," Vigsø, Denmark, 14–18 Aug 1995.

*Les neutralinos du halo sombre galactique*, IPNL, University of Lyon, France, May 1995.

*Gravitational microlensing of unresolved stars*, Institute for Radiation Sciences, Uppsala, Sweden, Aug 1994.

*AGAPE: a microlensing search by pixel amplification*, Institut d'Astrophysique, Paris, France, 1994.

*Particle dark matter*, Uppsala Astronomical Observatory, Uppsala, Sweden, 1993.

*Neutralino dark matter*, Stockholm University, Sweden, 1993.

*Neutralino dark matter*, Manne Siegbahn Institute, Stockholm, Sweden, 1993.

*Long-lived heavy dark matter*, University of California, Irvine, California, 8 Dec 1992.

*Long-lived heavy dark matter*, Bartol Research Institute, New Ark, Delaware, 3 Dec 1992.

*Long-lived heavy dark matter*, Ohio University, Columbus, Ohio, 30 Nov 1992.

*Long-lived heavy dark matter*, Michigan University, Ann Arbor, Michigan, 19 Nov 1992.

*Long-lived heavy dark matter*, Fermilab, Batavia, Illinois, 17 Nov 1992.

*Indirect detection of heavy unstable dark matter*, "The Fermilab Meeting: DPF 92," Fermilab, Batavia, Illinois, 10–14 Nov 1992.

*Indirect detection of weakly unstable massive dark matter particles*, Institute of Theoretical Physics, Warsaw, Poland, 23 Oct 1992.

*Dark matter and supersymmetry*, Institute of Theoretical Physics, Warsaw, Poland, 22 Oct 1992.

*Cosmic abundances of relic particles*, University of Torino, 16 Oct 1992.

*Constraints on heavy particles decaying into neutrinos*, "Trends in Astroparticle Physics," Santa Monica, California, 28 Nov–1 Dec 1990.

*Cornering the supersymmetry preferred dark matter candidate: the neutralino*, "Astrophysics and Particle Physics," San Miniato, 8–12 May 1989.

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## RESEARCH: Research Visits to Other Institutions

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Tokyo Institute of Technology, Tokyo, Japan, 1 June 2021–31 December 2021.

Institute for the Physics and Mathematics of the Universe, University of Tokyo, Japan, 12 December 2019–6 January 2020, and since 1 June 2021.

University of Sydney, Sydney, Australia, 1–11 December 2019.

Sogang University, Seoul, South Korea, 17–28 June 2019.

Yukawa Institute, Kyoto University, Japan, 13 May–2 June 2019.

Institute for the Physics and Mathematics of the Universe, University of Tokyo, Japan, 7–12 May 2019.

Sogang University, Seoul, South Korea, 7–21 July 2018.

Fudan University, Shanghai, China, 22–30 May 2018.

Yukawa Institute of Theoretical Physics, Kyoto, Japan, 2–9 July 2017, 16–22 July 2017, 18–23 Dec 2017, 27 Apr–22 May 2018.

Technical University, Garching, Germany, 4–27 April 2017.

Universidad de Santiago de Chile, Santiago, Chile, 14–23 January 2017.

Yukawa Institute of Theoretical Physics, Kyoto, Japan, 30 May–11 June 2016, 19–23 Dec 2016, and 3–6 Jan 2017.

Institute of Basic Sciences, Daejeon, South Korea, 30 November–12 December 2015.  
Sogang University, Seoul, South Korea, 15–29 November 2015.  
NORDITA, Stockholm, Sweden, 5-30 May 2014.  
Max Planck Institute for Physics, Munich, Germany, 1–4 October 2013.  
Sogang University, Seoul, South Korea, 7–12 October 2012.  
Fermilab, Batavia, Illinois, 10–19 August 2012.  
SABBATICAL: Seoul National University, Seoul, South Korea, 1 March–15 June 2012.  
SABBATICAL: Korean Institute of Advanced Studies, Seoul, South Korea, 1 January–29 February 2012.  
University of Bonn, Bonn, Germany, 10–19 November 2011.  
Kavli Institute for Theoretical Physics China, Beijing, China, 26 September–31 October 2011.  
SABBATICAL: Stockholm University, Stockholm, Sweden, 31 July–26 September 2011 and 1 November–11 December 2011.  
SISSA, Trieste, Italy, 11–15 October 2010.  
Korean Institute for Advanced Studies, Seoul, South Korea, 10 June–22 August 2010.  
Galileo Galilei Institute, Florence, Italy, 10 May–4 June 2010.  
Seoul National University, Seoul, South Korea, 11-28 March 2010.  
Institute for the Physics and Mathematics of the Universe, Tokyo, Japan, 7–11 December 2009.  
Seoul National University, Seoul, South Korea, 2–6 December 2009.  
LAPTH, Annecy, France, 6–23 June 2009.  
Stockholm University, Stockholm, Sweden, 2–17 May 2009.  
University of California, Los Angeles, California, 3-6 December 2008.  
Stockholm University, Stockholm, Sweden, 11-18 August 2008.  
Stockholm University, Stockholm, Sweden, 17–25 July 2006.  
University of California, Los Angeles, 6–25 Feb 2006.  
University of Washington, Seattle, 5–8 July 2005.  
University of California, Los Angeles, 31 Jan–12 Feb 2005.  
University of Michigan, Ann Arbor, 9–29 May 2004.  
University of California, Los Angeles, 12–21 February 2004.  
University of Michigan, Ann Arbor, 15 May–15 June 2003.  
Los Alamos National Laboratory, Los Alamos, 25 Apr–1 May 2003.  
University of Michigan, Ann Arbor, 1 July–3 Aug 2002.  
Max Planck Institute for Physics, Munich, Germany, 15 May–15 June 2002.  
Yukawa Institute for Theoretical Physics, Kyoto, Japan, 1–15 Mar 2002.  
Max Planck Institute for Physics, Munich, Germany, 3–22 Aug 2001.  
University of Michigan, Ann Arbor, 3–15 Jan 2001.  
CERN, Geneva, Switzerland, 4 May–5 June 2000.  
Fermilab, Batavia, Illinois, 15 Jan–4 Mar 2000.  
University of California, Los Angeles, 1 Nov–16 Dec 1999.



Center for Particle Astrophysics, Berkeley, California, 18–27 Oct 1999.  
Institute of High Energy Physics, Beijing, China, 22–30 May 1999.  
Collège de France, Paris, France, 29–30 March 1999.  
University of Oxford, UK, 22–28 March 1999.  
University of Michigan, Ann Arbor, Michigan, 9 Nov–7 Dec 1998.  
University of California, Berkeley, California, 1–31 March 1998.  
University of California, Los Angeles, California, 1–28 Feb 1998.  
Queen Mary College, London, UK, 10–11 Nov 1997.  
Institut d’Astrophysique and Collège de France, Paris, France, 15–29 June 1997.  
Uppsala University, Sweden, 28 May–8 June 1997.  
Collège de France, Paris, France, 21 May 1997.  
University of California, Los Angeles, California, Jan-March 1997.  
University of California, Los Angeles, California, 15–23 June 1996.  
Astronomical Observatory Pic-Du-Midi, France, 16–23 Oct 1995.  
Stockholm University and Uppsala University, Sweden, 14–29 March 1995.  
Astronomical Observatory Pic-Du-Midi, France, 8–22 Nov 1994.  
Stockholm University and Uppsala University, Sweden, 21 Aug–1 Sept 1994.  
University of California, Los Angeles, California, 5–12 Dec 1992.  
Fermilab, Batavia, Illinois, 10–29 Nov 1992.  
Institute of Theoretical Physics, Warsaw, Poland, 17–24 Oct 1992.  
Laboratori Nazionali del Gran Sasso, Italy, 3–8 Aug 1992.  
SISSA, Trieste, Italy, 10 July–2 Aug 1992 and 16 Aug–7 Sept 1992.  
University of Paris 6 & 7 (Jussieu), France, 21 June–10 July 1992.  
Institute of Theoretical Physics, Warsaw, Poland, 7–17 Jan 1992.

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## TEACHING: Courses Taught

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### University Courses

(U=undergraduate level, G=graduate level)

#### 2022:

"Introduction to Gravitation." University of Utah, Salt Lake City, Spring 2022: full responsibility (U).

"Introduction to Quantum Theory and Relativity." University of Utah, Salt Lake City, Spring 2022: full responsibility (U).

#### 2021:

"Introduction to Gravitation." University of Utah, Salt Lake City, Spring 2021: full responsibility (U).

#### 2020:

"Physics for Scientists I (Honors)." University of Utah, Salt Lake City, Fall 2020: full responsibility (U).

"Introduction to Gravitation." University of Utah, Salt Lake City, Spring 2020: full responsibility (U).

#### 2019:

"Quantum Mechanics I." University of Utah, Salt Lake City, Fall 2019: full responsibility (G).

"Quantum Mechanics II." University of Utah, Salt Lake City, Spring 2019: full responsibility (G).

"Physics for Scientists II (Honors)." University of Utah, Salt Lake City, Spring 2019: full responsibility (U).

#### 2018:

"Quantum Field Theory II." University of Utah, Salt Lake City, Spring 2018: full responsibility (G).

#### 2017:

"Physics for Scientists II (Honors)." University of Utah, Salt Lake City, Fall 2017: full responsibility (U).

"Quantum Field Theory I." University of Utah, Salt Lake City, Spring 2017: full responsibility (G).

#### 2016:

"Physics for Scientists II (Honors)." University of Utah, Salt Lake City, Fall 2016: full responsibility (U).

"Physics for Scientists and Engineers II: Electricity and Magnetism." University of Utah, Salt Lake City, Spring 2016: 2 sections, full responsibility (U).

#### 2015:

"Physics for Scientists and Engineers II: Electricity and Magnetism." University of Utah, Salt Lake City, Spring 2015: 2 sections, full responsibility (U).

#### 2014:

"Physics for Scientists and Engineers II: Electricity and Magnetism." University of Utah, Salt Lake City, Spring 2014: 2 sections, full responsibility (U).

**2012:**

"Physics for Scientists and Engineers II: Electricity and Magnetism." University of Utah, Salt Lake City, Fall 2012: 2 sections, full responsibility (U).

"Introduction to Particle Dark Matter," Seoul National University, Spring 2012: full responsibility (G).

**2011:**

"Honors Astronomy Think Tank." University of Utah, Salt Lake City, Spring 2011: co-taught with writer and photographer Stephen Trimble (U).

**2010:**

"Honors Astronomy Think Tank." University of Utah, Salt Lake City, Fall 2010: co-taught with writer and photographer Stephen Trimble (U).

Guest lecturer: "The nature of darkness." University of Utah, Salt Lake City, 8 February 2011: coordinating instructor Gregory Owen (U).

"Quantum Mechanics II," University of Utah, Salt Lake City, Spring 2010: full responsibility (G).

**2009:**

Two lectures ("Cosmology" and "Dark Matter") at the Osher Life-Long Learning Institute, Fall 2009.

"Quantum Mechanics I," University of Utah, Salt Lake City, Fall 2009: full responsibility (G).

"Quantum Mechanics II," University of Utah, Salt Lake City, Spring 2009: full responsibility (G).

**2008:**

Lecture on "Cosmology" at the Osher Life-Long Learning Institute, Fall 2008.

"Quantum Mechanics I," University of Utah, Salt Lake City, Fall 2008: full responsibility (G).

"Astroparticle Physics," University of Utah, Salt Lake City, Spring 2008: full responsibility (G).

**2007:**

"Quantum Mechanics I," University of Utah, Salt Lake City, Fall 2007: full responsibility (G).

**2006:**

"Physics for Scientists and Engineers I: Mechanics." University of Utah, Salt Lake City, Fall 2006: 2 sections, full responsibility (U).

**2005:**

"Physics for Scientists and Engineers I: Mechanics." University of Utah, Salt Lake City, Fall 2005: 2 sections, full responsibility (U).

**2004:**

"Physics for Scientists and Engineers I: Mechanics." University of Utah, Salt Lake City, Fall 2004: 2 sections, full responsibility (U).

"Mathematical Methods of Physics," University of Utah, Salt Lake City, Spring 2004: full responsibility (G).

**2003:**

"Introduction to Nuclear and Particle Physics," Case Western Reserve University, Cleveland, Spring 2003: full responsibility (U).

"Independent Studies," Case Western Reserve University, Cleveland, Spring 2003: complements of general relativity for graduate student Cheshana Marshall (G).

"Introductory Physics I," Case Western Reserve University, Cleveland, Spring 2003: 2 recitation sections (U).

**2002:**

"Introduction to Quantum Mechanics I," Case Western Reserve University, Cleveland, Fall 2002: full responsibility (U).

"Introductory Physics I," Case Western Reserve University, Cleveland, Fall 2002: 1 recitation section (U).

"General Relativity," Case Western Reserve University, Cleveland, Fall 2002: CWRU person in charge of the course taught by Rafael Sorkin of Syracuse University through video-conferencing (G).

"Introduction to Nuclear and Particle Physics," Case Western Reserve University, Cleveland, Spring 2002: full responsibility (U).

"General Physics I: Mechanics," Case Western Reserve University, Cleveland, Spring 2002: 2 recitation sections (U).

**2001:**

"General Relativity," Case Western Reserve University, Cleveland, Fall 2001: full responsibility (U/G).

"General Physics I: Mechanics," Case Western Reserve University, Cleveland, Fall 2001: 2 recitation sections (U).

"Introduction to Nuclear and Particle Physics," Case Western Reserve University, Cleveland, Spring 2001: full responsibility (U).

"General Physics I: Mechanics," Case Western Reserve University, Cleveland, Spring 2001: 2 recitation sections (U).

**2000:**

"General Physics I: Mechanics," Case Western Reserve University, Cleveland, Fall 2000: 2 recitation sections (U).

"General Physics II: Electricity and Magnetism," Case Western Reserve University, Cleveland, Fall 2000: 1 recitation section (U).

**High School, Vocational School, and Tutoring**

"Electricity and Magnetism" (including laboratory), Techno-Industrial Institute 'G. Marconi,' Monfalcone, Italy, 1986: full responsibility, final and prefinal years.

"Introduction to personal computers" I and II, ENAIP, Trieste, Italy, 1986-1987 and 1987-1988: full responsibility.

Private tutoring in mathematics and physics for secondary school students, Trieste, Italy, 1982–85.

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## TEACHING: Students and Postdoctoral Fellows Supervised

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### Ph.D. students supervised

Philip Beltracchi, 2018-2020, Ph.D 2020, University of Utah.

Xuefang Sui, 2009-2017, Ph.D. 2017, University of Utah. Currently Lecturer at Yantai Nanshan University, Yantai, China.

Luca Visinelli, 2007-2011, Ph.D. 2011, University of Utah. Currently Fellini Postdoctoral Fellow at INFN, Frascati, Italy; from 2021, Assistant Professor at Jiao Tong University, Shanghai, China.

Junya Kasahara, 2005-2009, Ph.D. 2009, University of Utah.

Thieu Nguyen, 2005-2006.

Moqbil Alenazi, 2005-2008, Ph.D. May 2008, University of Utah. Currently Professor and Vice-Dean of Admission and Registration at Northern Border University, Arar, Saudi Arabia.

### Postdoctoral fellows supervised

Tino Nyawelo (2006–2011). Currently Assistant Professor (Lecturer) at the University of Utah.

### Undergraduate research students supervised

Luca Visinelli, 2006-2007, B.S. 2007, University of Utah (as exchange student from the University of Bologna, Italy). Continued as Ph.D. student at the University of Utah.

Jason Underdown, 2005–2008, B.S. 2008, University of Utah.

### Undergraduate Supplemental Instructors supervised

Matthew Kress (2006), Daniel Allen (2005), Alison Hatt (2004).

### Undergraduate Teaching Assistants supervised

**2020:** Dalton Rasmussen (Physics for Scientists I - Honors).

**2017:** David Morison (Physics for Scientists II - Honors).

**2016:** Devan Anderson (Physics for Scientists II - Honors).

**2014:** Anthony Garcia (Physics for Scientists and Engineers II).

### Graduate Teaching Assistants supervised

**2022:** Dinesh Yadav (Introduction to Relativity and Quantum Mechanics).

**2019:** Shiyu Nie (Physics for Scientists II - Honors).

**2016:** Christopher Winterowd, Ren-Bo Wang (Physics for Scientists II - Honors).

**2015:** Michael Newbold, Mandefro Tefery, Enoch Lambert, Xuefang Sui, Jonathan Miller (Physics for Scientists and Engineers II).

**2014:** Brendan Pankovich, Paul Bergeron, KC Erb, Matthew Groesbeck, Peter Peroncik (Physics for Scientists and Engineers II).

**2012:** Rhett Zollinger, Richards Miller, Peter Peroncik, Christopher Winterowd (Physics for Scientists and Engineers II).

**2006:** Monica Allen, Elliott Barcikowski, Jose Cardoza, Gary Finnegan, Maged Moawad, Micahel Richardson, Priti Shah, Ryan Smith, Akiko Soemori (Physics for Scientists and Engineers I).

**2005:** Elliott Barcikowski, Joy Corley, Tyrel Giles, Brenna Gillman, Michelle Hui, Jon Paul Johnson, Ivan Rodriguez, Akiko Soemori, Caleb Trammel (Physics for Scientists and Engineers I).

**2004:** Vadym Apalkov (Mathematical Methods for Physicists); Brian Billeter, Matthew Dalton, Brenna Gillman, Ivan Rodriguez, Nathan Shepherd, Akiko Soemori, Nicholas Webb, Elliott Barcikowski, Marie Urry (Physics for Scientists and Engineers I).

**2003:** Feng Cai (Introduction to Nuclear and Particle Physics).

**2002:** Paul Baturin (Introduction to Nuclear and Particle Physics); Guilin Mao (Introduction to Quantum Mechanics I).

**2001:** Levon Pogosian, Dejan Stojkovich (Introduction to Nuclear and Particle Physics).

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**SERVICE: Departmental, College, University Committees**

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**2021-22:**

Member, College of Science RPT Committee.

Member, Physics & Astronomy Awards Committee (Faculty/Staff).

Member, Physics & Astronomy Faculty Theory Search Committee.

Member, Physics & Astronomy Graduate Recruitment and Admissions Committee.

**2020-21:**

Member, College of Science RPT Committee.

Member, Physics & Astronomy Seminar Series Committee.

Member, Physics & Astronomy Astronomy Program and Observatory Task Force.

Member, Physics & Astronomy Undergraduate Program and Curriculum Committee.

**2019-20:**

Member, Physics & Astronomy High Energy Astrophysics Faculty Search.

Member, Physics & Astronomy Cosmic Ray Physics Faculty Search.

Member, Physics & Astronomy Comprehensive Exam Committee.

Member, College of Science RPT Committee.

Chair, Physics & Astronomy High Energy Physics/Astrophysics Seminar Committee.

Chair, College of Science Academic Appeals and Misconduct Committee.

**2018-19:**

Member, Physics and Astronomy Common Exam Committee.

Chair, Physics & Astronomy High Energy Physics/Astrophysics Seminar Committee.

Member, College of Science Academic Appeals and Misconduct Committee.

**2017-18:**

Member, Physics & Astronomy Common Exam Committee.

Member, Physics & Astronomy Space Committee.

Member, Physics & Astronomy High Energy Theory Faculty Search.

Member, Physics & Astronomy Undergraduate Program Development Committee.

Member, College of Science Academic Appeals and Misconduct Committee.

**2016-17:**

Member, Physics & Astronomy Common Exam Committee.

Member, Physics & Astronomy Undergraduate Program Development Committee.

Member, Physics & Astronomy Graduate Program Development Committee.

**2015-16:**

Member, University General Education Council.

Member, University Seed Grants Committee

Member, Physics & Astronomy Graduate Program Development Committee.

**2014-15:**

Member, University General Education Council.

Member, University Studies Committee.

Member, University Seed Grants Committee

Member, Physics & Astronomy Common Exam Committee.

Member, Physics & Astronomy Graduate Program Development Committee.

**2013-14:**

Member, University Studies Committee.

Member, University General Education Council.

Member, University Seed Grants Committee

**2012-13:**

Chair, Physics & Astronomy Colloquium Committee.

Member, Physics & Astronomy Common Exam Committee.

Member, University Studies Committee.

Member, University Humanities Area Committee.

**2011-12:**

On sabbatical.

**2010-11:**

Chair, Physics & Astronomy Theoretical Particle Physics Faculty Search Committee.

Chair, Physics & Astronomy Outreach Committee.

Member, College of Science Frontiers of Science Committee (organizing the public lecture series "Frontiers of Science").

Member, University Graduate Council.

Chair of the Ph.D. Examining Committee of David Albornoz at the University of Grenoble in Annecy, France.

**2009-10:**

Member, Physics & Astronomy Astronomy Curriculum Committee.

Member, Physics & Astronomy Graduate Advising Committee.

Member, Physics & Astronomy High Energy Physics/Astrophysics Seminar Committee.

Member, Physics & Astronomy BOWTIE Seminar Committee.

Member, College of Science Frontiers of Science Committee (organizing the public lecture series "Frontiers of Science").

Member, University Graduate Council.

**2008-09:**

Chair, Physics Department International Year of Astronomy Committee.

Chair, Physics Department Astronomy/Astrophysics Faculty Search Committee.

Member, Physics Department Futures Committee.

Member, Physics Department Dave Schramm Memorial Astrophysics Seminar Series.

Member, Physics Department Policy Board.



Member, College of Science Frontiers of Science Committee (organizing the public lecture series "Frontiers of Science").

Member, University Student Response Workgroup.

Invited member of the Ph.D. Examining Committee of Nans Baro at the Université Claude Bernard Lyon in Annecy, France.

**2007-08:**

Chair, Astronomy Initiative Task Force.

Chair, Astronomy/Astrophysics Faculty Search Committee.

Chair, Physics Department Advising Committee (Honors).

Chair, Physics Department Futures Committee.

Chair, Physics Department Dave Schramm Memorial Astrophysics Seminar Series.

Member, College of Science Honors Committee.

Member, College of Science Frontiers of Science Committee (organizing the public lecture series "Frontiers of Science").

Member, Physics Department Policy Board.

Member, Physics Department Admissions Committee.

Participant in the University Leadership Development Course (a selective-admission course organized by the University of Utah Offices of the Senior Vice President for Academic Affairs and of the Associate Vice President for Faculty).

**2006-07:**

Chair, Astronomy Initiative Task Force.

Chair, Physics Department Advising Committee (Honors).

Chair, Physics Department High Energy/Cosmology Seminar Committee.

Chair, Physics Department BOWTIE Seminar Committee.

Chair, Technology in the Classroom Committee.

Member, College of Science Council.

Member, College of Science Honors Committee.

Member, College of Science Frontiers of Science Committee (organizing the public lecture series "Frontiers of Science").

Member, Physics Department Futures Committee.

Member, Physics Department Common Exam Committee.

Member, Physics Department Policy Board.

Member, Physics Department Student Honors/Awards Committee.

**2005-06:**

Chair, Astronomy Initiative Task Force.

Chair, Physics Department Advising Committee (Honors).

Chair, Theoretical High Energy Physics/Astrophysics Faculty Search Committee.

Chair, Physics Department High Energy Astrophysics/Cosmology Seminar Committee.

Chair, Physics Department BOWTIE Seminar Committee.

Member, College of Science Council.

Member, College of Science Honors Committee.

Member, College of Science Frontiers of Science Committee (organizing the public lecture series "Frontiers of Science").

Member, Physics Department Futures Committee.

Member, Physics Department Admissions Committee.

Member, Physics Department Space Committee.

Member, Physics Department Student Honors/Awards Committee.

**2004-05:**

Chair, Physics Department Advising Committee (Honors).

Member, College of Science Frontiers of Science Committee (organizing the public lecture series "Frontiers of Science").

Chair, Physics Department Committee for Technological Innovation in the Classroom.

Member, Physics Department Futures Committee.

Member, Physics Department Colloquium Committee.

Member, Physics Department High Energy Astrophysics/Cosmology Seminar Committee.

Chair, Physics Department BOWTIE Seminar Committee.

Member, Physics Department Astronomy Task Force.

Chair of 7 Auxiliary Personnel RPT Subcommittees

Member, Supervisory Committee of the following graduate students: Brian Billeter, Jeter Hall, Tingliang Zhuang, Ziwen Fu.

Member of 3 Oral Common Exam Committees.

Regularly entertaining speakers of the Frontiers of Science lecture, Physics Colloquium, and High Energy Astrophysics/Cosmology seminar.

**2003-04:**

Chair, Physics Department Advising Committee (Honors).

Member, College of Science Frontiers of Science Committee (organizing the public lecture series "Frontiers of Science").

Member, Physics Department High Energy Astrophysics/Cosmology Seminar Committee.

Chair, Physics Department BOWTIE Seminar Committee (creator of the seminar series).

Member, Physics Department Astronomy Task Force.

Chair of 7 Auxiliary Personnel RPT Subcommittees

Member, Astrophysics Faculty Search Committee.

**2001-02:**

Member, Particle Astrophysics Seminar Committee, Case Western Reserve University, Cleveland.

**2000-01:**

Chair, Particle Astrophysics Seminar Committee, Case Western Reserve University, Cleveland.

**1998-99:**

Colloquium organizer, Max Planck Institute for Physics, Munich.

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## SERVICE: Refereeing/Reviewing

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2019: Grant proposal reviewer for the National Science Foundation, the Fund for Scientific Research (Belgium), the National Science Centre (Poland), and the National Science and Technology Commission (Chile).

2018: Panelist for the National Science Foundation Graduate Research Fellowship Program. Grant proposal reviewer for the National Science Foundation, the Fund for Scientific Research (Belgium), the National Science Centre (Poland), and the National Science and Technology Commission (Chile).

2017: Grant proposal reviewer for the National Science Foundation, the Fund for Scientific Research (Belgium), and the European Research Council.

2016: Grant proposal reviewer for the National Science Foundation, the Department of Energy, and the Fund for Scientific Research (Belgium).

2015: Grant proposal reviewer for the National Science Foundation, and the Fund for Scientific Research (Belgium).

2014: Grant proposal reviewer for the National Science Foundation, and the Department of Energy.

2013: Grant proposal reviewer for the National Science Foundation, the Department of Energy, and the French Research Council.

2012: Panelist for the Department of Energy. Grant proposal reviewer for the National Science Foundation and the Israel National Foundation.

2011: Grant proposal reviewer for the National Science Foundation, and the Department of Energy.

2010: Grant proposal reviewer for the Department of Energy.

2009: Grant proposal reviewer for the National Science Foundation.

2008: Grant proposal reviewer for the National Science Foundation and NASA.

2007: Grant proposal reviewer for the National Science Foundation, the Department of Energy, the Italian Space Agency, and NASA.

2006: Grant proposal reviewer for the Israel National Foundation.

2005: Grant proposal reviewer for the British Particle Physics and Astrophysics Research Council.

2004: Grant proposal reviewer for the National Science Foundation.

2002: Grant proposal reviewer for Research Corporation.

Textbook reviewer for W.H. Freeman: "Physics for Scientists and Engineers" by Paul Tipler and Gene Mosca (6th revision).

Regular refereeing for Physical Review, Physical Review Letters, Physics Letters, Astroparticle Physics, Journal of High Energy Physics, Journal of Cosmology and Astroparticle Physics, Astronomy and Astrophysics, Astrophysical Journal, and Astrophysical Journal Letters (about 9 papers a year).

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## SERVICE: Organization of Scientific Meetings

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### 2022:

Member of the Local Organizing Committee, "Neutrinos from Accelerators (NuFACT)," Salt Lake City, Utah, 31 July–6 August 2022.

**2020:**

Member of the Scientific Advisory Committee, "Identification of Dark Matter," Vienna, Austria, 20–24 July 2020 (postponed because of Covid-19).

**2019:**

Member of the Scientific Advisory Committee, "Hadronic Contributions to New Physics Searches," Puerto de la Cruz, Tenerife, 23–29 September 2019.

Co-organizer of the workshop "Searching for new physics - Leaving no stone unturned," Salt Lake City, Utah, 29 July–9 August 2019.

**2013:**

Main organizer of the MITP Workshop "Cosmic-Rays and Photons from Dark Matter Annihilation: Theoretical Issues," Mainz, Germany, 29 June–2 July 2013.

**2012:**

Co-organizer of the 2012 Snowbird Workshop on Dark Matter Observations through Gamma Rays (SnowDOG 2010), Snowbird, Utah, 24–26 March 2012.

**2010:**

Co-organizer of the 2010 Snowbird Workshop on Particle Astrophysics, Astronomy and Cosmology (SnowPAC 2010), Snowbird, Utah, 23–28 March 2010.

**2009:**

Co-chair of the organizing committee of the 2010 Snowbird Workshop on Particle Astrophysics, Astronomy and Cosmology (SnowPAC 2009), Snowbird, Utah, 1–7 February 2009.

**2006:**

Member of the scientific advisory committee, "Dark Matter and Accelerator Physics," Irvine, California, 10–11 June 2006.

**2005:**

Co-organizer of the Aspen workshop on "Supercosmology," Aspen, Colorado, 31 July–21 August 2005.

**2004:**

Co-convenor of the Cosmology session at the International conference "Supersymmetry and unification of fundamental interactions," Tsukuba, Japan, 7-23 July 2004.

**2003:**

Convenor of the Dark Matter session at the International conference "COSMO 2003," Ambleside, England, August 2003.

**2001:**

Co-convenor of the P4-1 working group on Dark Matter at the Snowmass workshop on the "Future of Particle Physics," July 2001.

**2000:**

Member of the International Advisory Committee for the 3rd International Workshop on the Identification of Dark Matter, York, England, 18-22 September 2000.

**1999:**

Co-chair (with L. Roszkowski) of the "Tools for Dark Matter 99" workshop, CERN, Geneva, 2–6 August 1999.

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## SERVICE: Presenting science to popular audiences

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- Creator and manager of the outreach program Phun with Physics (2006-ongoing), reaching thousands of K-12 students and their families in Salt Lake County and Tooele county.
- Invited public lecture at the University of Sydney, Australia (Dec 2019).
- Wrote a public outreach article in the French edition of *Scientific American*: “Les étoiles noires: des astres venues du fond des âges” (Dark Stars from the Depths of Time) by K. Freese, P. Gondolo, P. Salati [Pour la science 426, 20 (Apr 2013)]
- Presentation on “The Nature of Darkness” at Science at Breakfast, a College of Science series of presentations to the local business community.
- Quoted in the *Salt Lake Tribune* about the Large Hadron Collider (September 2008).
- Quoted in the *Deseret News* about the University of Utah joining the Sloan Digital Sky Survey (September 2008).
- Introduced Lisa Randall’s work in the television program “Utah Now” (KUED, March 14, 2008)
- Press coverage of work on Dark Stars in *National Geographic News*, *Science News*, *New Scientist*, *Der Spiegel*, *USA Today*, *EE Times*, *Deseret News*, *BBC Sky at Night*, and several other newspapers and magazines worldwide. Also invited live radio interview on *KCPW-FM 88.3* (“Midday Utah”, December 5, 2007).
- Public lecture “Most of the Universe is not like us” at the Salt Lake Astronomical Society meeting (2005).
- Outreach project with the UofU Film Department, the Clark Planetarium, and Evans and Sutherland on the conception and production of a digital film on modern cosmology to be shown in planetariums worldwide (2005). The project was not completed due to difficulties in securing sufficient funds.
- Press coverage of work on Sagittarius dark matter stream in *The Dallas Morning News*, *Deseret News*, *Der Spiegel*, *Science China*, and several other newspapers and magazines world-wide (2004). Also aired on *KUER news* and reported in the University of Utah 2004 Research Annual Report *Journey of Discovery*.
- Interviewed by and quoted in *Science* (6 August 2004).
- Interviewed by and quoted in *New Scientist* (4 May 2002).
- Paper “Dark matter annihilation at the galactic center” (with J. Silk) featured in the American Institute of Physics *Physics News Update*, Number 446, 1 September 1999.

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## SERVICE: Public service

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- Set up a new undergraduate honors course as a partnership between the University of Utah, the Clark Planetarium, and K-12 schools in underserved districts of Salt Lake City, currently successfully taught by a K-12 teacher.
- Acted as scientific consultant in the production of “Scientia” by the Tanner Dance Theater, which debuted in Salt Lake City in 2008.
- Board member of the “Utah Science Heritage Project”, a project to install a permanent historical exhibit on astronomy in Utah at This Is The Place Heritage Park, Salt Lake City.

- Acted as consultant for the film "Dark Matter" by Chinese director Chen Shizheng with Liu Ye and Meryl Streep, which won the Alfred P. Sloan Prize for movies about science at the Sundance Independent Film Festival in 2007.
- Organized "Astronomy Day 2007" in collaboration with the Clark Planetarium and the Salt Lake Astronomical Society (21 April 2007).
- Introduced astronomy program to high-school students at "Science Day at the U," University of Utah (2006).
- "Astronomy Day 2006" at the Salt Lake City Main Library, in collaboration with the Clark Planetarium and the Salt Lake Astronomical Society (6 May 2006).
- Judge at Science Fairs at Morningside Elementary School (2004 and 2005) and Wasatch Junior High School (2004).
- Establishing connections with the local chapter of the American Association of University Women for the promotion of science among high school women students (2005).
- Instructed and guided K-6 students in hands-on demonstrations at the Science Night organized by the Shaker Heights School District, Ohio (2002 and 2003).