

# Andrew R. Zentner

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## Personal Information

**Birth date:** February 24, 1976 (which constrains  $\Omega_M < 5 \times 10^{16}$ )

**Birthplace:** New York, New York, USA

**Citizenship:** United States

**Family:** Married (Carrie), two sons (Cooper, Jan. 17, 2006, and August, April 16, 2008)

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## Education

1998-2003 **Ph.D. Physics**

Department of Physics, The Ohio State University, Columbus, OH, USA

Thesis Advisor: Professor Terrence P. Walker

1995-1998 **B.S. Electrical Engineering**

Department of Engineering, The Cooper Union for the Advancement of Science and Art,  
New York, NY, USA

Thesis Advisor: Professor Toby J. Cumberbatch

1994-1995 **Undergraduate Study**

Cornell University, Ithaca, NY USA

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## Appointments

9/2007– **Assistant Professor**

Department of Physics and Astronomy

The University of Pittsburgh, Pittsburgh, PA, USA

10/2006–9/2007 **National Science Foundation Fellow & Institute Fellow**

Kavli Institute for Cosmological Physics & Enrico Fermi Institute

The University of Chicago, Chicago, IL, USA

9/2003–9/2006 **Kavli Institute Fellow**

Kavli Institute for Cosmological Physics & Enrico Fermi Institute

The University of Chicago, Chicago, IL, USA

6/2003–9/2003 **Postdoctoral Researcher**

## Selected Honors and Awards

- 2006 **National Science Foundation Astronomy and Astrophysics Fellowship**, *The National Science Foundation*
- 2003 **Kavli Institute Fellowship**, *The University of Chicago*
- 2002 **Hazel S. Brown Award for Outstanding Teaching**, *The Ohio State University*
- 2002 **Ohio State Presidential Fellowship**, *The Ohio State University*
- 1998 **William A. Fowler Fellowship**, *The Ohio State University*
- 1998 **Jesse Sherman Boothe Award for Excellence in Research**, *The Cooper Union*
- 1998 **Class of 1907 Prize for Achievement in Mathematics**, *The Cooper Union*

## Funding Awards

- 2006 **Dark Matter Halo Substructure: A Key to Fundamental Physics and Galaxy Formation**, \$201k, NSF (PI)
- 2008 **A Unified Study of Dark Energy and Galaxy Formation**, \$248k, NSF (PI)  
**Toward Precision Cosmology in the Nonlinear Regime**, \$59k, DoE (CoPI with N. Gnedin, A. Kravtsov, S. Dodelson, W. Hu)
- 2010 **Toward New Astrophysical Insights on Particle Dark Matter** \$120k, NSF (PI)
- Pending **CAREER: Probing Cosmological Inflation on Small Scales** \$711k, NSF (PI)
- Pending **Cultivating New Astronomical Insights on Particle Dark Matter** \$339k, NASA (PI)
- Pending **Nonlinear Evolution of Cosmic Structure and Interpretation of Dark Matter Experiments** \$163k, NSF (CoPI)
- Pending **The Satellite-Subhalo Connection in Systems the Size of the Milky Way** \$191k NSF (CoPI)

## Professional Service & Societies

### ACTIVE REFEREE:

Nature

Science

Physical Review D & Physical Review Letters

The Astrophysical Journal & The Astrophysical Journal Letters

The Monthly Notices of the Royal Astronomical Society

The Journal of Cosmology and Astro-Particle Physics

New Astronomy

Astronomy & Astrophysics

The International Journal of Modern Physics

### GRANT REVIEW

- 2005 National Science Foundation Astronomy and Astrophysics Grants Panelist
- 2009 NASA Astrophysics Theory Program Panelist
- 2010 National Science Foundation AAPF Grants Panelist

### THE LARGE SYNOPTIC SURVEY TELESCOPE (LSST)

Member of Milky Way, Galaxies, Strong Lensing, and Weak Lensing Working Groups

Co-author (of 243 total authors) of the Large Synoptic Survey Telescope Science Book

### PROFESSIONAL SOCIETIES

The American Physical Society

The American Astronomical Society

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## Departmental Service

- 2009– **Outreach Committee**
- 2007– **Graduate Admissions Committee** (*Chair from 2009–*)
- 2007– **Graduate Recruitment Committee** (*Chair from 2009–*)
- 2007– **Information Technology Committee**
- 2007– **Colloquium Committee**
- 2006– **Allegheny Observatory Committee**
- 2006– **Cosmology Faculty Search Committee** (*Searches in 2006, 2007, 2008, & 2009*)

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## Conference Organization

- 2010 **Great Lakes Cosmology Workshop X**  
Scientific Organizing Committee  
June 14-16, 2010, Kavli Institute for Cosmological Physics, Chicago, IL USA
- 2009 **Santa Fe Cosmology Workshop**  
Weak Lensing Theory Working Group Leader  
July 19-25, 2009, Santa Fe, NM, USA
- 2009 **American Physical Society March Meeting**  
Invited Symposium Organizer & Symposium Chair  
*Windows on the Universe* Session on Cosmological Physics  
March 18, 2009, Pittsburgh, PA
- 2008 **The Great Lakes Cosmology Workshop IX**  
Scientific Organizing Committee  
June 8-11, 2008, Carnegie Mellon University, Pittsburgh, PA USA
- 2005 **New Views of the Universe, The Kavli Institute Inaugural Symposium**  
Local Organizing Committee  
December 8-13 2005, The University of Chicago, Chicago, IL USA

## Students Advised

### GRADUATE

- 2012 **Andrew P. Hearin**, *The University of Pittsburgh*  
2011 **Mei-Yu Wang**, *The University of Pittsburgh*  
2011 **Shailendra Vikas** *The University of Pittsburgh* (with Michael Wood-Vasey)  
2008 **Niraj Welikala** *The University of Pittsburgh* (with Andrew Connolly)  
2007 **Douglas H. Rudd** *The University of Chicago* (under the supervision of Andrey Kravtsov)  
2006 **Eduardo Rozo** *The University of Chicago* (under the supervision of Scott Dodelson)

### UNDERGRADUATE

- 2010 **Katlyn Daniluk** *The University of Pittsburgh*  
2009 **Rebecca Reesman** *Carnegie Mellon University*

## Postdoctoral Research Associates

- 2010- **Christopher W. Purcell** (*Ph.D., UC Irvine, 2010*)

## Teaching

- ASTRON 0113: Introduction to Astronomy (Lower-Division Undergraduate)  
ASTRON 1120: Stars, Stellar Structure, and Stellar Evolution (Upper-Division Undergraduate)  
ASTRON 2580/PHYS 3580: Galactic and Extragalactic Astronomy (Graduate Level)  
ASTRON 3785: Cosmology (Graduate Level)

## Education & Public Outreach

- 2009 **Organizer: International Year of Astronomy at the Carnegie Science Center**  
Fifteen lectures, cafe scientifique meetings, and other events  
2007- **Carnegie Science Center Girls Science and Math Project**  
2007- **Young Women's Leadership Charter School (YWLCS) Science Fair Supervisor**  
2006-2007 **Founder: YWLCS Research Internship Program**  
2006-2007 **Founder: YWLCS Project Mentorship Program**

## Selected Public Lectures

- 2010 ***How Stars Generate Energy and How we Exploit it***  
August 20, 2010  
Allegheny Observatory, Pittsburgh, PA USA  
***A Direct Proof that Space Expands***  
August 14, 2010  
Oil Region Astronomical Observatory, Oil City, PA USA  
***How the Sun (and other stars) Generate All of Our Energy***

- March 27, 2010  
Buhl Planetarium at the Carnegie Science Center, Pittsburgh, PA USA
- 2009** ***A Verification that Space Expands***  
November 20, 2009  
Allegheny Observatory, Pittsburgh, PA USA
- Energy from Stars***  
September 26, 2009  
Buhl Planetarium at the Carnegie Science Center, Pittsburgh, PA USA
- Gravitational Lensing***  
March 28, 2009  
Buhl Planetarium at the Carnegie Science Center, Pittsburgh, PA USA
- 2008** ***Using the Scientific Method to Explore Our Universe***  
Mt. Lebanon Public High School  
November 7, 2008
- How Dark Matter Telescopes Reveal the Nature of Dark Energy in the Universe***  
August 15, 2008  
Allegheny Observatory, Pittsburgh, PA USA
- Peering Through Cosmic Lenses with the Large Synoptic Survey Telescope (LSST)***  
March 29, 2008  
Buhl Planetarium at the Carnegie Science Center, Pittsburgh, PA USA
- 2007** ***The Tools of Cosmology Part II: The Contemporary Universe***  
November 16, 2007  
Allegheny Observatory, Pittsburgh, PA USA
- The Tools of Cosmology Part I: The Early Universe***  
October 19, 2007  
Allegheny Observatory, Pittsburgh, PA USA
- Cosmic Analogies***  
May 5, 2007  
Adler Planetarium, Chicago, IL USA

# Andrew R. Zentner

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## Peer-Reviewed Journal Publications

- 2010 ***Counts-in-cylinders as a Test of Galaxy Formation Models and the Excess of Isolated Galaxies***  
Heather D. Berrier, Elizabeth J. Barton, James S. Bullock, Joel C. Berrier, Andrew R. Zentner, and Risa H. Wechsler  
Submitted for Publication in The Astrophys. J.
- Probing Dark Energy with Galaxy Peculiar Velocities Derived From A Large Supernova Ia Survey***  
Suman Bhattacharya, Arthur Kosowsky, Jeffrey A. Newman, and Andrew R. Zentner  
Submitted to J. Cosmol. Astropart. Phys.
- The Distribution of Annihilation Luminosities in Dark Matter Substructure***  
Savvas M. Koushiappas, Andrew R. Zentner, and Andrey V. Kravtsov  
Submitted for Publication in Physical Review D  
[arXiv:1006.2391]
- Shapes of Gas, Gravitational Potential and Dark Matter in  $\Lambda$ CDM Clusters***  
Erwin T. Lau, Daisuke Nagai, Andrey V. Kravtsov, and Andrew R. Zentner  
Submitted for Publication in The Astrophys. J.  
[arXiv:1003.2270]
- A General Study of the Influence of Catastrophic Photometric Redshift Errors on Cosmology with Cosmic Shear Tomography***  
Andrew P. Hearin, Andrew R. Zentner, Zhaoming Ma, and Dragan Huterer  
Accepted for Publication in The Astrophys. J.  
[arXiv:1002.3383]
- The Impact of Theoretical Uncertainties in the Halo Mass Function and Halo Bias on Precision Cosmology***  
Hao-Yi Wu, Andrew R. Zentner, and Risa H. Wechsler  
The Astrophys. J. **713**, 856 (2010)  
[arXiv:0910.3668]
- 2009 ***High-Energy Neutrinos from Dark Matter Particle Self-Capture within the Sun***  
Andrew R. Zentner  
Phys. Rev. D **80**, 063501 (2009)  
[arXiv:0907.3448]
- Dark Matter Annihilation Around Intermediate-Mass Black Holes: An Update***  
Gianfranco Bertone, Mattia Fornasa, Marco Taoso, and Andrew R. Zentner

New J. of Physics **11**, 105016 (2009)

[arXiv:0905.4736]

***The Influence of Galaxy Formation Physics on Weak Lensing Tests of the Consistency of General Relativity***

Andrew P. Hearin and Andrew R. Zentner

J. Cosmol. and Astropart. Phys. **2009-04**, 32 (2009)

[arXiv:0904.3334]

***Cold Dark Matter Substructure and Galactic Disks II: Dynamical Effects of Hierarchical Satellite Accretion***

Stelios Kazantzidis, Andrew R. Zentner, Andrey V. Kravtsov, James S. Bullock, and Victor P. Debattista

The Astrophys. J. **700**, 1896 (2009)

[arXiv:0902.1983]

***Dark Matter Annihilation Rates with Velocity-Dependent Annihilation Cross Sections***

Brant E. Robertson and Andrew R. Zentner

Phys. Rev. D **79**, 083525 (2009)

[arXiv:0902.0362]

***Collapse Barriers and Halo Abundance: Testing the Excursion Set Ansatz***

Brant E. Robertson, Andrey V. Kravtsov, Jeremy L. Tinker, and Andrew R. Zentner

The Astrophys. J. **696**, 636 (2009)

[arXiv:0812.3148]

***Utilizing Type Ia Supernovae in a Large, Fast, Imaging Survey to Constrain Dark Energy***

Andrew R. Zentner and Suman Bhattacharya

The Astrophys. J. **693**, 1543 (2009)

[arXiv:0812.0358]

***Biases in the Gravitational Lens Population Induced by Halo and Galaxy Triaxiality***

Eduardo Rozo, Jacqueline Chen, and Andrew R. Zentner

Accepted for Publication in the Astrophys. J.

[arXiv:0710.1683]

**2008 *The Metallicity of the Diffuse Intra-Halo Light***

Chris W. Purcell, James S. Bullock, and Andrew R. Zentner

Mon. Not. R. Astron. Soc. **391**, 550 (2008)

[arXiv:0805.2965]

***Merger Histories of Galaxy Halos Implications for Disk Survival***

Kyle R. Stewart, James S. Bullock, Risa H. Wechsler, Ariyeh H. Maller, and Andrew R. Zentner

The Astrophys. J. **683**, 597 (2008)

[arXiv:0711.5027]

***Self-Calibrating Tomographic Weak Lensing for the Physics of Baryons to Constrain the Dark Energy***

Andrew R. Zentner, Douglas H. Rudd, and Wayne Hu

Phys. Rev. D **77**, 043507 (2008)

[arXiv:0709.4029]

***Cold Dark Matter Substructure and Galactic Disks I: Morphological Signatures of Hierarchical Satellite Accretion***

Stelios Kazantzidis, James S. Bullock, Andrew R. Zentner, Andrey V. Kravtsov, and Leonidas A. Moustakas

The Astrophys. J. **688**, 254 (2008)

[arXiv:0708.1949]

***Effects of Baryons and Dissipation on the Matter Power Spectrum***

Douglas H. Rudd, Andrew R. Zentner, and Andrey V. Kravtsov

The Astrophys. J. **672**, 19 (2008)

[arXiv:astro-ph/0703741]

**2007 *Isolating Triggered Star Formation***

Elizabeth J. Barton, Jacob A. Arnold, Andrew R. Zentner, James S. Bullock, and Risa H. Wechsler

The Astrophys. J. **671**, 1538 (2007)

[arXiv:0708.2912]

***Shredded Galaxies as the Source of Diffuse Intra-Halo Light on Varying Scales***

Chris W. Purcell, James S. Bullock, and Andrew R. Zentner

The Astrophys. J. **666**, 20 (2007)

[arXiv:astro-ph/0703004]

***The Excursion Set Theory of Halo Mass Functions, Halo Clustering, and Halo Growth***

Andrew R. Zentner

Int. J. Mod. Phys. D **16**, 763, Reviews (2007)

[arXiv:astro-ph/0611454]

***Formation of  $z \sim 6$  Quasars from Hierarchical Mergers***

Yuxing Li, Lars Hernquist, Brant E. Robertson, Thomas J. Cox, Philip F. Hopkins, Volker Springel, Liang Gao, Tiziana Di Matteo, Andrew R. Zentner, Adrian Jenkins, and Naoki Yoshida

The Astrophys. J. **665**, 187 (2007)



[arXiv:astro-ph/0608190]

***Angular Distribution of Satellite Galaxies From the Sloan Digital Sky Survey Data Release 4***

Marco Azzaro, Santiago, G. Patiri, Francisco Prada, and Andrew R. Zentner  
Mon. Not. R. Astron. Soc. **376**, 43 (2007)

[arXiv:astro-ph/0604506]

**2006** ***Close Galaxy Counts as a Probe of Hierarchical Structure Formation***

Joel C. Berrier, James S. Bullock, Elizabeth J. Barton, Heather D. Guenther, Andrew R. Zentner, and Risa H. Wechsler

The Astrophys. J. **652**, 56 (2006)

[arXiv:astro-ph/0604506]

***The Dependence of Halo Clustering on Halo Formation History, Concentration, and Occupation***

Risa H. Wechsler, Andrew R. Zentner, James S. Bullock, and Andrey V. Kravtsov

The Astrophys. J. **652**, 71 (2006)

[arXiv:astro-ph/0512416]

***The Peculiar Velocities of Satellites of External Disk Galaxies***

M. Azzaro, Andrew R. Zentner, F. Prada, and Anatoly A. Klypin

The Astrophys. J. **645**, In 228 (2006)

[arXiv:astro-ph/0506547]

***The Robustness of Density Profiles in Dissipationless Mergers***

Stelios Kazantzidis, Andrew R. Zentner, and Andrey V. Kravtsov

The Astrophys. J. **641**, 647 (2006)

[arXiv:astro-ph/0510583]

***Statistics of Magnification Perturbations by Substructure in the Cold Dark Matter Cosmological Model***

Eduardo Rozo, Andrew R. Zentner, Gianfranco Bertone, and Jacqueline Chen

The Astrophys. J. **639**, 573 (2006)

[arXiv:astro-ph/0506573]

***Testing Models of Black Hole Seed Formation with Gravity Waves***

Savvas M. Koushiappas and Andrew R. Zentner

The Astrophys. J. **639**, 7 (2006)

[arXiv:astro-ph/0503511]

**2005** ***A New Signature of Dark Matter Annihilation: Gamma-Rays From Intermediate-Mass Black Holes***

Gianfranco Bertone, Andrew R. Zentner, and Joseph Silk

Phys. Rev. D **72**, 103517 (2005)

[arXiv:astro-ph/0509565]

***Probing the Shape of the Galactic Halo with Hyper-Velocity Stars***

Oleg Y. Gnedin, Andrew Gould, Jordi Miralda-Escudé, and Andrew R. Zentner

The Astrophys. J. **634**, 344 (2005)

[arXiv:astro-ph/0506573]

***The Anisotropic Distribution of Galactic Satellites***

Andrew R. Zentner, Andrey V. Kravtsov, Oleg Y. Gnedin, and Anatoly A. Klypin

The Astrophys. J. **629**, 219 (2005)

[arXiv:astro-ph/0502496]

***The Physics of Galaxy Clustering I: A Model for Subhalo Populations***

Andrew R. Zentner, Andreas, A. Berlind, James S. Bullock, Andrey V. Kravtsov, and Risa H. Wechsler

The Astrophys. J. **624**, 505 (2005)

[arXiv:astro-ph/0411586]

***Dark Energy and Dark Matter Haloes***

Mike Kuhlen, Louis E. Strigari, Andrew R. Zentner, James S. Bullock, and Joel R. Primack  
Mon. Not. R. Astron. Soc. **357**, 387 (2005)

[arXiv:astro-ph/0402210]

**2004** ***The Effect of Gas Cooling on the Shapes of Dark Matter Halos***

Stelios Kazantzidis, Andrey V. Kravtsov, Andrew R. Zentner, Brandon A. Allgood, Daisuke Nagai, and Ben Moore

Astrophys. J. Lett. **611**, L73 (2004)

[arXiv:astro-ph/0405189]

***The Observability of Gamma-rays from Neutralino Annihilations in Milky Way Substructure***

Savvas. M. Koushiappas, Andrew R. Zentner, and Terry P. Walker

Phys. Rev. D **69**, 043501 (2004)

[arXiv:astro-ph/0309464]

**2003** ***Halo Substructure and the Power Spectrum***

Andrew R. Zentner and James S. Bullock

The Astrophys. J. **598**, 49 (2003)

[arXiv:astro-ph/0304292]

**2002** ***Inflation, Cold Dark Matter, and the Central Density Problem***

Andrew R. Zentner and James S. Bullock

Phys. Rev. D **66**, 043003 (2002)

[arXiv:astro-ph/0205216]

***Constraints on the cosmological relativistic energy density***

Andrew R. Zentner and Terry P. Walker

Phys. Rev. D **65**, 063506 (2002)

[arXiv:astro-ph/0110533]

***CMB (and other) challenges To BBN***

Gary Steigman, James P. Kneller, and Andrew R. Zentner

Revista Mexicana de Astronomía y Astrofísica **65**, 265 (2002)

[arXiv:astro-ph/0102152]

**Selected Forthcoming Submissions**

**2010+ *Generating Mock Gamma-ray Sky Maps from Dark Matter Annihilations***

Savvas M. Koushiappas, Andrew R. Zentner, and Andrey V. Kravtsov

Intended for submission to Phys. Rev. D

***The Observed Power-Law Galaxy Two-Point Function is a Cosmic Coincidence***

Douglas Watson, Andreas A. Berlind, Andrew R. Zentner

Intended for submission to The Astrophys. J.

***The Large-scale Response of Dark Matter Halos to Baryonic Condensation***

Mei-Yu Wang, Shailendra Vikas, Andrew R. Zentner, Tiziana Di Matteo, and Andrey V. Kravtsov

Intended for submission to The Astrophys. J.

***Weak Lensing Constraints on Models of Unstable Dark Matter***

Mei-Yu Wang and Andrew R. Zentner

Intended for submission to Phys. Rev. D

***Effects of Asymmetric Dark Matter on the Sun and Stellar Populations***

Andrew P. Hearin and Andrew R. Zentner

Intended for submission to Physical Review D

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**Proceedings, White Papers, and Other Publications**

**2010 *Counts-in-Cylinders as a Test of Galaxy Formation Models and the Excess of Isolated Galaxies***

Heather Guenther, Elizabeth J. Barton, James S. Bullock, Joel C. Berrier, Andrew R. Zentner, and Risa H. Wechsler

Bulletin of the American Astron. Soc. **42**, 303 (2010)

**2009 *The LSST Science Book***

The LSST Collaboration (243 authors including Andrew R. Zentner)

Available from <http://www.lsst.org>

[arXiv:0912.0201]

***Strong Gravitational Lensing Probes of the Particle Nature of Dark Matter***

Leonidas A. Moustakas et al. (47 authors including Andrew R. Zentner)

In *Astro2010: The Astronomy and Astrophysics Decadal Survey White Papers*, 214 (2009)  
[arXiv:0902.3219]

***Science Frontiers In Galaxy Evolution: Deep-Wide Surveys***

Henry Ferguson et al. (55 authors including Andrew R. Zentner)

In *Astro2010: The Astronomy and Astrophysics Decadal Survey White Papers*, 79 (2009)

***Cold Dark Matter Substructure and Galactic Disks***

Stelios Kazantzidis, Andrew R. Zentner, and James S. Bullock

Int. Astron. U. Symp. **254**, 417 (2009), Edited by J. Anderson, J. Bland-Hawthorn, and B. Nordstrom

[arXiv:0807.2863]

***Using Supernovae from a Large Imaging Survey to Measure Peculiar Velocities: Cosmological Implications***

Suman Bhattacharya, Andrew R. Zentner, Jeffrey A. Newman, and Arthur Kosowsky

Bulletin of the American Astron. Soc. **41**, 448 (2009)

***The LSST Galaxies Science Collaboration: Nearby Groups and Clusters***

The LSST Galaxies Collaboration (21 authors including Andrew R. Zentner)

Bulletin of the American Astron. Soc. **41**, 367 (2009)

***A Constraint on Star Formation Quenching Timescales***

Christopher Trinh, Elizabeth J. Barton, James S. Bullock, Andrew R. Zentner, and Risa H. Wechsler

Bulletin of the American Astron. Soc. **41**, 245 (2009)

**2006 *Effects of Baryons and Dissipation on the Matter Power Spectrum***

Douglas H. Rudd, Andrew R. Zentner, and Andrey V. Kravtsov

Bulletin of the American Astron. Soc. **38**, 966 (2006)

***Understanding Galaxies in Pairs***

Elizabeth J. Barton, Andrew R. Zentner, James S. Bullock, and Risa H. Wechsler

Bulletin of the American Astron. Soc. **38**, 956 (2006)

***The Triaxial Distribution of CDM Halos***

Andrew R. Zentner

Euro. Astron. Soc. Pub. Ser. **20**, 41 (2006)

[arXiv:astro-ph/0510376]

***The Effect of Baryons on Halo Shapes***

Stelios Kazantzidis, Andrew R. Zentner, and Daisuke Nagai

Euro. Astron. Soc. Pub. Ser. **20**, 65 (2006)

[arXiv:astro-ph/0508114]

**2005 *Dark Matter Halos: Shapes, the Substructure Crisis, and Indirect Detection***

Andrew R. Zentner, Savvas M. Koushiappas, and Stelios Kazantzidis

In *The Identification of Dark Matter*, 98 (2005), Edited by N. J. C. Spooner and V. Kudryavtsev

[arXiv:astro-ph/0502118]

**2003 *Gamma-rays from Neutralino Annihilation in Milky Way Substructure: What Can We Learn?***

Savvas M. Koushiappas, Andrew R. Zentner, and Terry P. Walker

Proc. 4<sup>th</sup> Marseille International Conference on Where Cosmology and Fundamental Physics Meet

[arXiv:astro-ph/0309516]

***Galactic Densities, Substructure, and the Initial Power Spectrum***

James S. Bullock and Andrew R. Zentner

Nucl. Phys. B Proc. Suppl. **124**, 131 (2003)

[arXiv:astro-ph/0207534]

***Halo Substructure and the Power Spectrum***

Andrew R. Zentner and James S. Bullock

American Institute of Physics Conf. Ser. **666**, 151 (2003)

[arXiv:astro-ph/0112339]

**2002 *Dark Matter Substructure: Cosmology and the Initial Power Spectrum***

James S. Bullock and Andrew R. Zentner

Bulletin of the American Astron. Soc. **34**, 1170 (2002)

**2000 *Global Constraints on Key Cosmological Parameters***

Gary Steigman, Terry P. Walker, and Andrew R. Zentner

[arXiv:astro-ph/0012149]

# Andrew R. Zentner

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## Selected Invited Talks

2010 ***Predicting Halo Structure for Dark Matter and Dark Energy Identification***

Plenary Talk at the *Identification of Dark Matter 2010*

Montpellier II University

Montpellier, France, July 27, 2010

***The Effects of Baryons on Dark Matter Structures***

Plenary Talk at *TeV Particle Astrophysics 2010*

Institute for Astrophysics of Paris

Paris, France, July 23, 2010

***The Power-Law Nature of the Galaxy Correlation Function is a Coincidence!***

Kavli Institute Seminar

Kavli Institute for Cosmological Physics at The University of Chicago

Chicago, IL, May 7, 2010

***Cosmology with Gravitational Lensing***

Colloquium

Department of Physics and Astronomy, Ohio University

Athens, OH, March 3, 2010

***A Cosmology Program Exploiting Weak Gravitational Lensing***

Colloquium

Department of Physics, Case Western Reserve University

Cleveland, OH, February 25, 2010

2009 ***Dark Matter Constraints from Stars***

High-Energy Physics/Astrophysics Seminar

Department of Physics, Pennsylvania State University

State College, PA, November 11, 2009

***Indirect Limits on the Properties of Dark Matter***

High-Energy Physics Seminar

Department of Physics, Case Western Reserve University

Cleveland, OH, October 9, 2009

***Astrophysical Constraints on Dark Matter Properties***

Cosmology Seminar

Department of Physics, The University of Michigan

Ann Arbor, MI, August 14, 2009

***Weak Lensing Cosmology: A Systematic Program for Theorists***

*Santa Fe Cosmology Workshop* at St. John's College

Santa Fe, NM, July 22, 2009

***New Perspectives on Indirect, Astrophysical, Dark Matter Limits***

Invited Review at *TeV Particle Astrophysics* at the Stanford Linear Accelerator Center

Stanford, CA, July 14, 2009

***Next Generation Probes of Dark Energy with Large Imaging Surveys***

Theory Division Colloquium (T-2), Los Alamos National Laboratory

Los Alamos, NM, May 11 2009

***Public Outreach for the International Year of Astronomy Through Faculty and Museum Partnerships***

Invited Review at the *March Meeting* of the American Physical Society

Pittsburgh, PA, March 18, 2009

***A Future with Weak Gravitational Lensing: Challenges and Opportunities***

Colloquium

Department of Physics and Astronomy, The University of California, Irvine

Irvine, CA, March 10, 2009

**2008 *Novel Approaches to Dark Matter Halo Substructure with Applications***

High-Energy Theory Seminar

Department of Physics, Brown University

Providence, RI, December 3, 2008

***Dark Energy and the Formation of Galaxies***

Yale Center for Astronomy and Astrophysics Colloquium

Department of Physics and Department of Astronomy, Yale University

New Haven, CT, December 2, 2008

***Challenges for Dark Energy Cosmology with Next Generation Surveys***

Cosmology Seminar

Kavli Institute for Astrophysics and Space Research, Massachusetts Institute of Technology

Cambridge, MA, October 28, 2008

***A Program to Exploit Weak Gravitational Lensing to Constrain Dark Energy***

Colloquium

Department of Physics, Brown University

Providence, RI, October 27, 2008

***The Theory of Gravitational Lensing***

Department of Statistics, Carnegie Mellon University  
Pittsburgh, PA, October 15, 2008

***Galaxy Formation as a Challenge to Weak Lensing Constraints on Dark Energy***

*Upcoming Lensing Surveys: Beyond the Obvious* at the Canadian Institute for Theoretical Astrophysics

Toronto, ON, CA, June 11, 2008

***Applications of Analytic Treatments of Dark Matter Halo Substructure***

*Small-scale Structure of Dark Matter* Workshop at the Perimeter Institute

Waterloo, ON, CA, June 7, 2008

***The LSST Lensing Program: Issues for Numerical Cosmology***

*The LSST All Hands Meeting*

Remote Talk given May 19, 2008

***Theory Necessary to Maximize the Scientific Yield of Future Photometric Surveys***

Cosmology Seminar

Center for Cosmology and Astro-Particle Physics, The Ohio State University

Columbus, OH, May 13, 2008

***A Unified Approach to the Dark Energy and Galaxy Formation Conundrums***

Colloquium

Department of Physics and Astronomy, Vanderbilt University

Nashville, TN, February 6, 2008

**2007 *Dark Energy, Weak Lensing, and Galaxy Formation***

*Cosmic Cartography: Mapping the Universe from the Big Bang to the Present*

The University of Chicago

Chicago, IL, December 5, 2007

***Weak Gravitational Lensing and Dark Energy***

Cosmology Seminar

Carnegie Mellon University

Pittsburgh, PA, October 12, 2007

***Dark Matter Halos and Their Environments***

*The Great Lakes Cosmology Workshop VIII* at The Ohio State University

Columbus, OH, June 1, 2007

***Constraining Dark Matter Physics on Sub-galactic Scales***

*Astrophysical Probes of Dark Matter* Workshop at the University of California, Irvine

Irvine, CA, March 21, 2007

***The Shape of the Milky Way Halo and Halos Beyond***



Theoretical Astrophysics Seminar  
Theoretical Astrophysics Seminar, University of California, Berkeley  
Berkeley, CA, March 19, 2007

***The Devil is in the Baryons: Halo Shapes and Gravitational Lensing***

Theory Colloquium (T-6/T-8), Los Alamos National Laboratory  
Los Alamos, NM, January 25, 2007

***Baryonic Physics in Forthcoming Weak Gravitational Lensing Surveys***

Astrophysics Seminar, Los Alamos National Laboratory  
Los Alamos, NM, January 21, 2007

**2006 *The Properties of Dark Matter from Halo Structure and Substructure***

COSMO 2006: International Workshop On Particle Physics and the Early Universe  
Granlibakken Conference Center, Tahoe City, CA, September 28, 2006

***Lectures on The Excursion Set Theory of Halo Formation and Clustering***

Given as part of the *Helmholtz Institute for Supercomputational Physics Sixth Summer School: Supercomputational Cosmology*  
Astrophysikalisches Institut Potsdam  
Potsdam, Germany, July 2006

***A New Particle-Astrophysics Connection in Dark Matter Halos***

*Fundamental Astro-Particle Physics: A Conference Gary Steigman's 65<sup>th</sup> Birthday*  
Center for Cosmology and Astro-Particle Physics at The Ohio State University  
Columbus, OH, May 19, 2006

***The Shapes of Halos as a Probe of the Physics of Dark Matter***

Colloquium  
Department of Physics, New York University  
New York, NY, April 10, 2006

***New Probes of Cosmology Through Nonlinear Structure Growth***

Colloquium  
Department of Physics and Astronomy, Rutgers University  
Piscataway, NJ, February 24, 2006

***A Cosmologist's Tools***

Astrophysics Seminar  
Department of Physics and Astronomy, Rutgers University  
Piscataway, NJ, February 23, 2006

***Cold Dark Matter and the Shapes of Dark Matter Halos***

Cosmology Seminar

Department of Physics and Astronomy, The University of Pittsburgh  
February 14, 2006

***The Growth of Cosmic Structure as a Probe of Particle Physics***

Colloquium

Department of Physics, The University of Pittsburgh  
Pittsburgh, PA, February 13, 2006

***Cosmology on Nonlinear Scales***

Astrophysics Seminar

Department of Astrophysical Sciences, Princeton University  
Princeton, NJ, January 16, 2006

***Particle Physics from Cosmology in the Nonlinear Regime***

Center for Cosmology and Particle Physics Seminar

Department of Physics, New York University  
New York, NY, January 13, 2006

**2005 *Testing Models of Supermassive Black Hole Formation Using Gravity Waves***

*New Views of the Universe* Inaugural Symposium of the Kavli Institute

Kavli Institute for Cosmological Physics at the University of Chicago

Chicago, IL, December 12, 2005

***Halo Substructure as a Cosmological Probe in the Nonlinear Regime***

Theoretical Astrophysics Seminar

Fermi National Accelerator Laboratory

Batavia, IL, December 5, 2005

***The Properties of Dark Matter Subhalos: Simulations and Analytic Models***

*The MIT-Kavli Institute and Space Research Workshop on Dark Matter Substructure*

Massachusetts Institute of Technology

Cambridge, MA, October 2, 2005

***Insights into Subhalo Properties and the Environmental Dependence of Galaxy Clustering***

The University of California, Santa Cruz

Santa Cruz, CA, August 11, 2005

***Halo Substructure in Gamma-Rays***

*TeV Particle Astrophysics* at FermiLab

Fermi National Accelerator Laboratory

Batavia, IL, July 15, 2005

***$\Lambda$ CDM on Small Scales and Cosmology from the Nonlinear Regime***

*The Frontiers of Contemporary Physics III* Conference  
Vanderbilt University  
Nashville, TN, May 25, 2005

***The Distribution and Evolution of Cold Dark Matter Halo Substructure***  
*The Dynamics of Galaxies: Baryons and Dark Matter*  
The University of Nevada at Las Vegas  
Las Vegas, NV, March 11, 2005

***Constraining Cosmology and Dark Matter with Nonlinear Structures***  
Cosmology Seminar  
Department of Physics, The Ohio State University  
Columbus, OH, May 3, 2005

2004 ***The Cold Dark Matter Substructure Crisis and the Detection of Dark Matter***  
*The Identification of Dark Matter 2004*  
The University of Edinburgh  
Edinburgh, Scotland, UK, September 6, 2004

***Insights into the Physics of Galaxy Clustering: Analytic Approaches***  
The University of California, Santa Cruz  
Santa Cruz, CA, August 6, 2004

***Halos, Subhalos, and the Galaxies They Host: What Physics Drives the Features of Galaxy Clustering***  
*Santa Fe Cosmology Workshop* at St. John's College  
Santa Fe, NM, July 16, 2004

***Adventures with Dark Matter Halos and Galaxy Clustering***  
Kavli Institute for Cosmological Physics Colloquium  
The University of Chicago  
Chicago, IL, April 7, 2004

2002 ***CDM Substructure in a Cosmological Context***  
Cosmology Seminar  
Department of Astronomy and Astrophysics, The University of Chicago  
Chicago, IL, December 16, 2002

***Inflation, Quintessence, and the Implications for CDM on Small Scales***  
*CDM 2002 Workshop on Cold Dark Matter on Small Scales: Current and Future Tests*  
The Center for Cosmological Physics, The University of Chicago  
Chicago, IL, August 2, 2002

## Selected Contributed Talks

- 2009 ***Another Perspective on High-Energy Neutrinos from Dark Matter in the Sun***  
*CCAPP Symposium 2009: Towards Fundamental Breakthroughs in Astrophysics and Cosmology within the Next Decade*  
Center for Cosmology and Astro-Particle Physics, The Ohio State University  
Columbus, OH, October 12, 2009
- Utilizing Type Ia Supernovae in a Large, Fast, Imaging Survey to Probe Dark Energy***  
Aspen Winter Conference 2009: *Understanding the Dark Sector*  
Aspen Center for Physics  
Aspen, CO, January 28, 2009
- 2008 ***A Theory Program to Exploit Gravitational Lensing to Probe Dark Energy and Dark Matter***  
*Texas Symposium on Relativistic Astrophysics*  
Vancouver, BC, CA, December 8, 2008
- Supernova Cosmology Beyond Luminosity Distances: Magnification and Peculiar Velocity***  
COSMO 2008: International Workshop on Particle Physics and the Early Universe  
The University of Wisconsin, Madison  
Madison, WI, August 25, 2008
- Exploiting Photometric Surveys to Constrain Dark Energy***  
*The Dark Side II* at the Michigan Center for Theoretical Physics  
Ann Arbor, MI, June 2, 2008
- 2005 ***The Shapes of Halos and the Angular Distributions of Subhalos***  
The XXI<sup>st</sup> IAP Colloquium: *Mass Profiles and Shapes of Cosmological Structures*  
Institut d'Astrophysique de Paris  
Paris, France, July 4, 2005
- Subhalo Populations, Strong Gravitational Lensing, and Implications***  
University of Zurich Conference on *The Formation of Disk Galaxies*  
Ascona, Switzerland, June 30, 2005
- Probing Structure Formation in the Universe with Gamma-rays and Gravity Waves***  
*Frontiers of Contemporary Physics III* Conference  
Vanderbilt University  
Nashville, TN, May 24, 2005
- 2004 ***The Effect of Baryons on the Shapes of Dark Matter Halos: Implications in the Milky Way***

*Santa Fe Cosmology Workshop* at St. John's College  
Santa Fe, NM, July 7, 2004

**2003 *Small-scale Cold Dark Matter After WMAP***

*Great Lakes Cosmology Workshop VII* at the University of Michigan  
Ann Arbor, MI, May 16, 2003

**2002 *CDM Halos: Substructure, Merger Histories, and the Primordial Power Spectrum***

October Astrophysics Conference in Maryland: *The Emergence of Cosmic Structure*  
College Park, MD, October 8, 2002

***Dark Halo Densities, Substructure, and the Inflationary Power Spectrum***

COSMO 2002: International Workshop on Particle Physics and the Early Universe  
Chicago, IL, September 20, 2002

***Cold Dark Matter on Small Scales and the Predictions of the Inflationary Paradigm***

Contributed Seminar at the *Theoretical Advanced Studies Institute*  
Department of Physics, University of Colorado, Boulder  
Boulder, CO, June 7, 2002