

## Claudio Punzo, Ph.D.

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### Education

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| Ph.D., (Cell Biology), University of Basel, Basel, BS, Switzerland<br>Thesis Title: Functional analysis of <i>Pax-6</i> genes during eye development and evolution.<br>Advisor: Dr. Walter J. Gehring                                               | 2001 |
| B.S., (Cell Biology), Biozentrum University of Basel, Basel, Switzerland<br>Thesis Title: Regulation of temperature-induced heat shock reaction of <i>Drosophila ambigua</i> and <i>Drosophila melanogaster</i> .<br>Advisor: Dr. Walter J. Gehring | 1997 |

### Postdoctoral Training

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|-----------------------------------------------------------------------------------------------------------------------------|-----------|
| Postdoctoral Fellow/Scholar<br>Supervisor: Constance L. Cepko<br>Department of Genetics, Harvard Medical School, Boston, MA | 2002-2010 |
|-----------------------------------------------------------------------------------------------------------------------------|-----------|

### Academic Appointments

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Associate Professor<br>Department Ophthalmology, Department of Neurobiology & Gene Therapy Center,<br>University of Massachusetts Medical School, Worcester, MA | 2017-present |
| Assistant Professor<br>Department Ophthalmology, Department of Neurobiology & Gene Therapy Center,<br>University of Massachusetts Medical School, Worcester, MA | 2015-2017    |
| Assistant Professor<br>Department Ophthalmology & Gene Therapy Center, University of Massachusetts<br>Medical School, Worcester, MA                             | 2010-2015    |

### Honors and Awards

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|----------------------------------------------------------------------------------------------|-----------|
| Long-Term Fellowship (EMBO: European Molecular Biology Organization)                         | 2002-2004 |
| Award for best Poster presentation (USGEB Young Investigator Meeting, Lausanne, Switzerland) | 2001      |

### Professional Memberships and Activities

|                                                                     |              |
|---------------------------------------------------------------------|--------------|
| ARVO (Association for Research in Vision and Ophthalmology). Member | 2004-present |
| AAAS (American Association for the Advancement of Science). Member  | 2010-present |
| ISER (International Society for Eye Research). Member               | 2014-present |
| ASGCT (American Society of Gene and Cell Therapy)                   | 2016-present |

### Editorial Responsibilities

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|-------------------------------------|--------------|
| BMC Ophthalmology, Associate Editor | 2012-present |
| Frontiers in Neuroscience, Reviewer | 2009-present |

Updated:

|                                                                  |              |
|------------------------------------------------------------------|--------------|
| Genomics, Reviewer                                               | 2011-present |
| Investigative Ophthalmology and Visual Science (IOVS), Reviewer  | 2011-present |
| Journal of Neuroscience, Reviewer                                | 2011-present |
| Proceedings of the National Academy of Sciences (PNAS), Reviewer | 2011-present |
| Cold Spring Harbor Protocols, Reviewer                           | 2012-present |
| PLOS One, Reviewer                                               | 2012-present |
| Molecular Vision, Reviewer                                       | 2012-present |
| Experimental Eye Research, Reviewer                              | 2015-present |
| Cell Report, Reviewer                                            | 2015-present |
| Cellular and Molecular life Science, Reviewer                    | 2016-present |
| FASEB Journal, Reviewer                                          | 2016-present |

## Educational Activities

### Teaching Activities

- BBS 782: Tutorial: Bases of Brain Diseases. Role: Course Director 2018-present
- BBS 782 Tutorial: Bases of Brain Diseases. Role: One two hour session with approximately 10 students. Session Title: Retinitis Pigmentosa 2011-present
- BBS 760: Introduction into Neuroscience. Role: One hour lecture on visual processing from retina to brain with approximately 10 students. Session Title: Visual Processing. 2014-present

### Graduate Student Education

- Member, Neuroscience Program 2010-present
- Member, Cell Biology Program 2010-present
- Member, Interdisciplinary Graduate Program 2010-present
- Qualifier Exam Committee
  - 5 Students to date 2011-present
- Thesis Exam Committee:
  - 5 Students to date 02011-present

### External Educational Activities

- **University of Connecticut** (Storrs, CT, USA): The discovery of ectopic eyes: A retrospective view. Role: A 30 min lecture within a course. 11/2013
- **Backer College** (Leicester, MA, USA): Use of animals in research. Role: One 45 min lecture on the use of animals in research. 04/2013
- **Harvard Medical School** (Boston, MA, USA): Ocular gene Therapy. Role: One 2 hours lecture one the use of gene therapy for eye diseases as part of a larger course on gene therapy. 12/2010

### Advising and Mentoring

#### Students

- Ph.D. students GSBS Program (Role: Mentor)
  - 3 Ph.D. Students to date 2011-present
- Rotation Students GSBS Program (Role: Mentor)
  - 7 Students to date 2011-present

**Postdoctoral Trainees**

3 Postdoctoral fellows to date

2010-present

**Grants****Current**

|                                                                                                           |                    |           |
|-----------------------------------------------------------------------------------------------------------|--------------------|-----------|
| National Institute of Health/ NEI                                                                         | 1R01EY023570       | 2013-2018 |
| Claudio Punzo (PI)                                                                                        |                    |           |
| Title: Delaying cone death in retinitis pigmentosa.                                                       |                    |           |
| Description: Identify the downstream targets of mTORC1 that promote cone survival in retinitis pigmentosa |                    |           |
| Total, direct & indirect costs: \$ 2,084,600                                                              |                    |           |
| Role: PI (40% effort)                                                                                     |                    |           |
| BrightFocus Foundation for Macular Degeneration                                                           | Claudio Punzo (PI) | 2017-2019 |
| Title: Role of photoreceptors in age-related macular degeneration                                         |                    |           |
| Description: Studying the role of photoreceptor metabolism in the development of AMD                      |                    |           |
| Total, direct & indirect costs: \$ 160,000                                                                |                    |           |
| Role: PI (5% effort)                                                                                      |                    |           |

**Completed**

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------|
| International Retinal Research Foundation (IRRF)                                                                                                                                                                        | Claudio Punzo (PI) | 2013-2014 |
| Title: Modulation of the mTOR pathway: A novel approach to extend vision in dry Age-related macular degeneration.                                                                                                       |                    |           |
| Description: The project aims at testing is increasing cell metabolism in a cell autonomous manner in photoreceptors prologs photoreceptor survival in the sodium iodate model of dry Age-related macular degeneration. |                    |           |
| Total, direct & indirect costs: \$96,450                                                                                                                                                                                |                    |           |
| Role: PI (8% effort)                                                                                                                                                                                                    |                    |           |
| International Retinal Research Foundation (IRRF)                                                                                                                                                                        | Claudio Punzo (PI) | 2014-2015 |
| Title: Modulation of the mTOR pathway: A novel approach to extend vision in dry Age-related macular degeneration.                                                                                                       |                    |           |
| Description: The project aims at testing is increasing cell metabolism in a cell autonomous manner in photoreceptors prologs photoreceptor survival in the sodium iodate model of dry Age-related macular degeneration. |                    |           |
| Total, direct & indirect costs: \$99,685                                                                                                                                                                                |                    |           |
| Role: PI (8% effort)                                                                                                                                                                                                    |                    |           |
| Massachusetts Lions Eye Research Fund Inc.                                                                                                                                                                              | Claudio Punzo (PI) | 2015-2016 |
| Title: Prolonging vision in Age-related Macular degeneration                                                                                                                                                            |                    |           |
| Description: Identifying why in females mice photoreceptors are more resistant to sodium iodate induced retinal-pigmented epithelium loss.                                                                              |                    |           |
| Total, direct & indirect costs: \$ 15,333                                                                                                                                                                               |                    |           |
| Role: PI (5% effort)                                                                                                                                                                                                    |                    |           |

**Technology Development****Patents**

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|-------------------------------------------------------------|------|
| Methods for inhibiting starvation of a cell (US2010/031211) | 2010 |
|-------------------------------------------------------------|------|

## Publications

### Peer-reviewed publications

1. Venkatesh A., Cheng S.Y., **Punzo C.** Loss of the cone-enriched caspases-7 does not affect secondary cone death in retinitis pigmentosa. *Molecular Vision*: **23**: 944-951 (2017)
2. Petit L. Ma S., Cheng S.Y., Gao Guangping., **Punzo C.** Rod Outer Segment Development Influences AAV-Mediated Photoreceptor Transduction After Subretinal Injection. *Human Gene Therapy*: **28** (6): (2017).
3. Petit L. & **Punzo C.** (2016). Gene Therapy Approaches for the Treatment of Retinal Disorders. *Discovery Medicine*: **22** (121).
4. Camacho E.T., **Punzo C.**, Wirkus S.A. Quantifying the metabolic contribution to photoreceptor death in retinitis pigmentosa via a mathematical model. *Journal of Theoretical Biology*: **408**: 75-87 (2016).
5. Venkatesh A., Ma S., **Punzo C.** TSC but not PTEN loss in starving cones of retinitis pigmentosa mice leads to an autophagy defect and mTORC1 dissociation from the lysosome. *Cell Death & Disease*: **7** (6): e2279 (2016)
6. Petit L., Khanna H., **Punzo C.** Advances in gene Therapy for Diseases of the Eye. *Human Gene Therapy*: **27** (8): 563-579 (2016).
7. Choudhury S.R., Fitzpatrick Z., Harris A.F., Maitland S.A., Ferreira J.S., Zhang Y., Ma S., Sharma R.B., Gray-Edwards H.L., Johnson J.A., Johnson A.K., Alonso L.C., **Punzo C.**, Wagner K.R., Maguire C.A., Kotin R.M., Martin D.R., Sena-Esteves M. (2016) *In vivo* selection yields AAV-B1 capsid for CNS and muscle gene therapy. *Molecular Therapy*: **24** (7): 1247-1257 (2016).
8. Zieger M. & **Punzo C.** Improved cell metabolism prolongs photoreceptor survival upon retinal-pigmented epithelium loss in the sodium iodate induced model of geographic atrophy. *Oncotarget*: **7** (9): 9620-9633 (2016).
9. Petit L. & **Punzo C.** mTORC1 sustains vision in retinitis pigmentosa. *Oncotarget*: **6** (19): 16786-16787 (2015).
10. Cepko C.L. & **Punzo C.** Sugar for Sight. *Nature*: **522** (7557): 428-29 (2015).
11. Ma S., Venkatesh A., Langellotto F., Le Y. Z., Hall M. N., Ruegg M. A., **Punzo C.** Loss of mTOR signaling affects cone function, cone structure and expression of cone specific proteins without affecting cone survival. *Experimental Eye Research*: **135**: 1-13 (2015).
12. Venkatesh A., Ma S., Le Y. Z., Hall M. N., Ruegg M. A., **Punzo C.** Activated mTORC1 promotes long-term cone survival in retinitis pigmentosa mice. *J of Clin. Inves.*: **125** (4): 1446-58 (2015).
13. Banday A.R., Baumgartner M., Al Seesi S., Karunakaran D.K., Venkatesh A., Congdon S., Lemoine C., Kilcollins A.M., Mandoiu I., **Punzo C.**, Kanadia R.N. Replication-dependent histone genes are actively transcribed in differentiating and aging retinal neurons. *Cell Cycle*: **13** (16): 2526-2541 (2014).
14. Venkatesh A., Ma S., Langellotto F., Gao G., **Punzo C.** Retinal gene delivery by rAAV and DNA electroporation. *Current Protocol*: Chapter 14:Unit14D.4 (2013).
15. Molnar T., Barabas P., Birnbaumer L., **Punzo C.**, Kefalov V., Krizaj D. Store-operated channels regulate intracellular calcium in mammalian rods. *J. of Physiol.*: **590** (15): 3465-3481 (2012).
16. Hafler B.P., Surzenko N., Beier K.T., **Punzo C.**, Trimarchi J.M., Kong J.H., Cepko C.L. (2012) Transcription factor Olig2 defines subpopulations of retinal progenitor cells biased toward specific cell fates. *Proc. Natl. Acad. Sci.*: **109** (20): 7882-7887 (2012).
17. **Punzo C.**, Xiong W, Cepko C.L. Loss of daylight vision in retinal degeneration: are oxidative stress and metabolic dysregulation to blame? *J. of Bio. Chem.*: **287** (3): 1642-1648 (2012).
18. Huang W, Xing W, Ryskamp DA, **Punzo C.**, Krizaj D. Localization and phenotype-specific expression of ryanodine calcium release channels in C57BL6 and DBA/2J mouse strains. *Exp. Eye Res.*: **93** (5): 700-709 (2011).
19. Krizaj D., Huang W., Furukawa T., **Punzo C.**, Xing W. Plasticity of TRPM1 expression and localization in the wild type and degenerating mouse retina. *Vision Res.*: **50** (23): 2460-2465

- (2010).
20. **Punzo C.**, Kornacker K., Cepko C.L. Stimulation of the insulin/mTOR pathway delays cone death in a mouse model of Retinitis Pigmentosa. *Nature Neuroscience*: **12** (1): 44-52 (2009).
  21. Kanadia R.N., Clark V.E., **Punzo C.**, Trimarchi J., Cepko C.L. Temporal requirement of the alternative splicing factor Sfrs1 for the survival of retinal neurons. *Development*: **135**: 3922-33 (2008).
  22. Plaza S., Prince F., Adachi Y., **Punzo C.**, Cribbs D., Gehring W.J. Cross-regulatory Protein-Protein Interactions between Hox and Pax Transcription factors. (2008) *PNAS*: **105**: 13439-44 (2008).
  23. **Punzo C.**, and Cepko C.L. (2008) Ultrasound-guided *in utero* injections allow studies of ocular development and function. *Developmental Dynamics*: **237** (4): 1034-42 (2008).
  24. Liu F., Jenssen T.K., Trimarchi J., **Punzo C.**, Cepko C.L., Ohno-Machado L., Hovig E., Patrick Kuo W. Comparison of hybridization-based and sequencing-based gene expression technologies on biological replicates. *BMC Genomics*: **8**: 153 (2007).
  25. **Punzo C.**, and Cepko C.L. Cellular responses to photoreceptor death in the rd1 mouse model of retinal degeneration. *Invest Ophthalmol Vis Sci*: **48** (2): 849-857 (2007).
  26. Kuo W.P., Liu F., Trimarchi J., **Punzo C.**, Lombardi M., Sarang J., Whipple M.E., Maysuria M., Serikawa K., Lee S.Y., McCrann D., Kang J., Shearstone J.R., Burke J., Park D.J., Wang X., Rector T.L., Ricciardi-Castagnoli P., Perrin S., Choi S., Bumgarner R., Kim J.H., Short G.F. 3rd, Freeman M.W., Seed B., Jensen R., Church G.M., Hovig E., Cepko C.L., Park P., Ohno-Machado L., Jenssen T.K. A sequence-oriented comparison of gene expression measurements across different hybridization-based technologies. *Nat Biotechnol*: **24** (7): 832-840 (2006).
  27. **Punzo C.**, Plaza S., Seimiya M., Schnupf P., Kurata S., Jaeger J., and Gehring W.J. Functional divergence between *eyeless* and *twin of eyeless* in *Drosophila melanogaster*. *Development*: **131** (16): 3943-53 (2004).
  28. **Punzo C.**, Seimiya M., Gehring W.J., and Plaza S. (2002) Differential interaction of *eyeless* and *twin of eyeless* with the *sine oculis* enhancer. *Development*: **129** (3): 625-34 (2002).
  29. **Punzo C.**, Kurata S., and Gehring W.J. (2001) The *eyeless* homeodomain is dispensable for eye development in *Drosophila*. *Genes & Development*: **15**: 1716-1723 (2001).

## Invited Presentations (Talks)

### International

- The duality of mTORC1 in promoting cone survival in Retinitis Pigmentosa. ISER Biennial Meeting, Tokyo, Japan 09/29/2016
- Mechanisms of cone protection in Retinitis Pigmentosa. FASEB Meeting, Blue Sky, Montana, USA 06/18/2016
- Prolonging Cone survival in Retinitis Pigmentosa. ISER Biennial Meeting, San Francisco, California, USA. 07/20/2014
- The mechanism of disease pathogenesis in Retinitis Pigmentosa. Meeting on Evolution of Vision, Les Treilles, France. 06/09/2009
- Starvation: A new mechanism for cone death in Retinitis Pigmentosa. ARVO meeting: Reducing disparities in eye disease and treatment. Florida, Fort Lauderdale USA. 05/07/2009
- Understanding rod mediated cone death. Twelfth annual Vision Research conference: Mechanism of macular degeneration. Florida, Fort Lauderdale, USA. 05/01/2009
- Rod toxin and rod trophic factor in Retinitis Pigmentosa. ARVO meeting: Visual Prostheses Research. Florida, Fort Lauderdale USA. 05/14/2008
- The rod toxin and rod trophic factor hypothesis in Retinitis Pigmentosa. University of Basel, Basel, Switzerland. 12/17/2007

- *Pax-6* function during development and evolution. IDAC Summer Workshop on Developmental Biology, Sendai, Japan. 07/14/2001

#### National

- Prolonging cone survival in Retinitis Pigmentosa. Department of Ophthalmology, University of Oklahoma Health and Science Center, Oklahoma City, OK, USA. 11/21/2013
- Mechanism of disease pathogenesis in Retinitis Pigmentosa. National Eye Institute, Bethesda, MD, USA. 06/23/2009
- Mechanism of disease pathogenesis in Retinitis Pigmentosa. University of North Carolina, Chapel Hill, NC, USA. 05/11/2009
- Mechanism of disease pathogenesis in Retinitis Pigmentosa. Yale Eye Center, New Haven, CT, USA. 02/25/2009
- Retinitis Pigmentosa: The mechanism of disease pathogenesis. Wright State University, Dayton, OH, USA. 02/20/2009
- Prolonging vision in Retinitis Pigmentosa by saving cones. Washington University School of Medicine, St Louis, MO, USA 06/26/2008
- Prolonging vision in Retinitis Pigmentosa by saving cones. Moran Eye Center, Salt Lake City, UT, USA. 06.03/2008
- From light to genetic inherited eye diseases. 41<sup>st</sup> SBAO (Swiss Ophthalmology Association) Conference. Bern, Switzerland. 03/19/2001

#### Regional

- The *eye/less* homeodomain is dispensable for eye development in *Drosophila*. Swiss Drosophila Meeting, Fribourg, Switzerland. 03/31/2001
- The *eye/less* homeodomain is dispensable for eye development in *Drosophila*. Regional Meeting, Freiburg, Germany). 03/02/2001

#### Local

- The Theory of everything: Why, where and what causes Age-related Macular Degeneration to develop. Albert Biology Colloquium (ABC seminar series), UMass Medical School, Worcester, MA USA. 02/09/2018
- Retinitis Pigmentosa: from disease to treatment. UMass Neuroscience Seminar Series 09/08/2016
- Insulin signaling in rods and cones: Lessons for diabetic retinopathy and age-related macular degeneration. UMass Vision Seminar Series, Worcester, MA, USA. 08/18/2016
- Insulin signaling in rods and cones: Lessons for diabetic retinopathy and age-related macular degeneration. Massachusetts Eye and Ear Infirmary, Harvard Medical School, Boston, MA, USA. 07/26/2016
- Delaying Vision loss in Retinitis Pigmentosa. Albert Biology Colloquium (ABC seminar series), UMass Medical School, Worcester, MA USA. 11/14/2014
- Mechanism of disease pathogenesis in Retinitis Pigmentosa. Massachusetts Eye and Ear Infirmary, Harvard Medical School, Boston, MA, USA. 03/27/2009

### Other Presentations (Posters & Abstracts)

#### International

- Petit L., Ma S., Cheng S.Y., Gao G., **Punzo C.** Rod outer segments influence the efficiency of AAV-mediated rod transduction. ARVO: Imaging in the eye conference. Baltimore, Maryland, USA. (Investigative Ophthalmology & Visual Science 58 (13), 4094-4094) 05/10/2017
- Venkatesh A., Ma S., **Punzo C.** Activation of mTORC1 is sufficient for long-term cone survival in retinitis pigmentosa. ARVO: Leading eye and vision research. Orlando, Florida, USA. (Investigative Ophthalmology & Visual Science 55 (13), 3985-3985). 04/30/2014

- Ma S., Venkatesh A., **Punzo C.** Loss of mTORC1 & mTORC2 but not mTORC1 or mTORC2 leads to reduction in cone function. ARVO: Leading eye and vision research. Orlando, Florida, USA. (Investigative Ophthalmology & Visual Science 55 (13), 378-378). 04/30/2014
- Molnar T., Barabas P., **Punzo C.**, Krizaj D. Store-operated Calcium Entry Regulates Intracellular Calcium Homeostasis In Mouse Rod Photoreceptors. ARVO: Visionary Genomics. Fort Lauderdale, Florida, USA (Investigative Ophthalmology & Visual Science 52 (14), 6581-6581). 04/22/2011
- Krizaj D., Witkovsky P., Barabas P., **Punzo C.**, Renteria R. C., Liedtke W., Huang W. H. Expression and Function of TRPV4 Channels in the Vertebrate Retina. ARVO: The Future of Eye & Vision Research. Fort Lauderdale, Florida, USA (Investigative Ophthalmology & Visual Science 51 (13), 1860-1860). 04/17/2010
- Krizaj D., Huang W., Zou J., **Punzo C.**, Birnbaumer L., Barabas P. The Canonical Trpc1 Channel Modulates Rod Signals in the Mammalian Retina. ARVO: Reducing disparities in eye disease and treatment. Fort Lauderdale, Florida, USA (Investigative Ophthalmology & Visual Science 50 (13), 5177-5177). 04/28/2009
- Roesch K., Jadhav A., **Punzo C.**, Sun B., Cepko C.L. Muller glia cell response to retinal degeneration. ARVO: The aging eye. Florida, Fort Lauderdale USA (Investigative Ophthalmology & Visual Science 48 (13), 2948-2948). 05/10/2007
- **Punzo C.**, Cepko C. L. Ultrasound guided in utero gene delivery: A tool to manipulate early born retinal cell types. ARVO: The aging eye. Fort Lauderdale, Florida, USA (Investigative Ophthalmology & Visual Science 48 (13), 4603-4603). 05/10/2007
- **Punzo C.**, Cepko C. L. Distinct cellular responses to rod and cone death in the rd1 mouse model of retinal degeneration. ARVO: Building international collaborations. Fort Lauderdale, Florida, USA (Investigative Ophthalmology & Visual Science 47 (13), 5774-5774). 05/01/2006

#### National

- Venkatesh A., Ma S., **Punzo C.**, Applying mTORC1 to prolong vision in Retinitis Pigmentosa. American Society for Cell Biology (ASCB). San Diego, California, USA. 12/2015
- Venkatesh A., Ma S., **Punzo C.** mTOR signaling and autophagy in retinal disease. Autophagy Keystone Symposium. Breckenridge, Colorado, USA. 06/2015

#### Regional

- **Punzo C.** Preventing blindness in retinitis pigmentosa: One size fits all. inKNOWvation Gene Therapy. Cambridge, Massachusetts, USA. 05/2016

#### Local

- Cheng S.Y., Ma S., **Punzo C.** A paradigm-shifting hypothesis for the development of age-related macular degeneration. UMass Metabolic Meeting at Pfizer. Cambridge Massachusetts, USA. 05/2017
- Cheng S.Y., Ma S., **Punzo C.** A paradigm-shifting hypothesis for the development of age-related macular degeneration. UMass Basic Sciences Retreat 10/2016
- Venkatesh A., Ma S., **Punzo C.** Applying mTORC1 to prolong vision in Retinitis Pigmentosa. UMass Basic Sciences Retreat 10/2015
- Venkatesh A., Ma S., Le Y. Z., Hall M. N., Ruegg M. A., **Punzo C.** Activation of mTORC1 is sufficient for long-term cone survival in Retinitis Pigmentosa. UMass Basic Sciences Retreat (Venkatesh: Poster Award winner). 07/2014
- Venkatesh A., **Punzo C.** Apoptotic cone cell death in retinitis pigmentosa. 01/2013
- UMass Basic Science Retreat

#### Professional Development

- Basic training ... ABC's for IACUC & IBCs: Frameworks for compliance (UMass) 2013
- Junior Faculty Development Program (UMass) 2011-2012

## **Committee Assignments and Administrative Service**

### **Department**

- **Gene Therapy Center:** Webpage design, development & maintenance 2014-present
- **Gene Therapy Center:** Training & Maintenance of microscope facility of GTC. 2012-present
- **Ophthalmology:** Course Director of Vision Seminar Series. 2016-present

### **School**

- Multiple Mini Interviews (MMI) for prospective Medical School Students 2014-present
- Interviews of prospective M.D./Ph.D. and Ph.D. Students for GSBS Program 2011-present

### **University**

- IACUC (member), UMASS Medical School 2012-present

### **External Professional Service**

NIH: Ad hoc reviewer BVS and BNVT Study Sections  
 Swiss National Science Foundation: Ad hoc mail Reviewer  
 Israel Science Foundation: Ad hoc mail reviewer  
 Fight for Sight: Ad hoc mail reviewer  
 Retina France: Ad hoc mail reviewer