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Molecular, Cellular and Developmental Biology
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PERSONAL INFORMATION: Born 28 March 1953, Philadelphia, PA. U.S.A.

EDUCATION:

Ph.D., Biophysics, California Institute of Technology, 1980.

B.S., Biophysics with high distinction, The Pennsylvania State University. 1974.

ACADEMIC POSITIONS:

Visiting Professor, Science Education ETH Zurich, Switzerland

(February 2013-July 2013)

Co-director, CU Teach science and mathematics teacher preparation program, initially funded by the National Mathematics and Sciences Institute and UC Boulder.

Founding Fellow and member of the Project Management Team, Center for STEM Learning, UC Boulder (2010-present)

Professor, 1996 - present. Molecular, Cellular & Developmental Biology

University of Colorado, Boulder

Associate Professor, 1990 - 1996. Molecular, Cellular & Developmental Biology

University of Colorado, Boulder

Assistant Professor, 1983 - 1990. Molecular, Cellular & Developmental Biology

Post-doctoral Fellow with Lee L. Rubin, Ph.D. 1982 - 1983.

The Rockefeller University, New York, New York.

Postdoctoral Fellow with Dr. Martin C. Raff, MD 1980 - 1982. Medical Research

Council Neuroimmunology Project, University College London

Ph.D. Thesis with Robert M. Stroud, Ph.D. CalTech/UCSF 1975-1979.

Undergraduate Research with Wallace Snipes & Alec Keith, Penn. State. 1973-1974.

OTHER ACTIVITIES:

Consultant, Middle High School pre-AP Biology Curriculum Project, College Board. 2014-2015.

Reviewer, 2014 for NRC report "Reaching Students: What research says about Effective instruction in Undergraduate Science and Engineering.

Member, American Society for Biochemistry and Molecular Biology Public Outreach Committee, 2011-present

Member, Advisory Board Misconceptions Oriented Standards-based Assessment Resource for Teachers of High School Life Science (MOSART-HSLs) NSF DRL-1316645 (2013-2015)

Consultant on education, evaluateSCIENCE AG, Hardturmstrasse 66, CH-8005 Zürich (August 2013)

Program reviewer, Austrian Academy of Sciences (June 2012)

Frequent Contributor, MadScientist Network (<http://www.madsci.org/>)

Editorial Board, PLoS One, 2010-present.

OTHER ACTIVITIES, Continued

Faculty of 1000, 2011-present.
Editorial Board, "Differentiation" 2003- 2010
Editorial Board, "Cell Communication & Adhesion" 2001- 2010
Editorial Board, "Cell Motility & the Cytoskeleton" 2001- 2009
Editorial Board, "The Dynamic Cell - A CD-ROM", Springer-Verlag (1996-2000).
Reviewer, NIH, NSF, ACS study section review panels
Consultant for Knowledge Factor, Inc. Lafayette, CO. (2003)
Consultant for Ontogeny, Inc. Cambridge, MA. (1999-2006)
Consultant for Molecular Cell Biology Web Site, W.H. Freeman, publishers.(1999-2002).
Founder, virtuallaboratory.net, inc. 1999-present (A Colorado Company)
Consultant, College Board, 2014-present
Visiting Faculty, ETH Zurich 2013, 2015, 2016, 2019
Consultant, beSocratic project 2010-present Michigan State University
ASSETT Fellow, UC Boulder 2019-2020.

FELLOWSHIPS, AWARDS, HONORS:

Pennwalt Foundation Scholarship, Pennsylvania State University, 1971-1974
Elected Phi Beta Kappa/Sigma Chi, 1974.
Muscular Dystrophy Association Post-doctoral Fellow,
University College London & The Rockefeller University, 1980 - 1983.
NIH National Research Service Award/National Institute of Neurological &
Communicative Disorders & Stroke. The Rockefeller University, 1983.
Basil O'Conner Start-Up Award / March of Dimes Foundation. 1984-1986
Pew Biomedical Scholar. 1985-1991.
Co-Chair (1994) & Chair (1996) - Gordon Conference on Intermediate Filaments.
Co-Chair (with J.L. Maller) 6th International Xenopus Meeting (1996).
Co-organizer, Southwest Regional meeting of the Society for Developmental Biology,
October, 2005.
John Doctor Award, best poster in education, Society for Developmental Biology, 2006
Annual meeting.
Mortar Board Teaching Award, UC Boulder, 2007
Elected fellow, American Association for the Advancement of Science, 2008
Best Should Teach Award, UC Boulder, 2009.
2013 **Outstanding Undergraduate Science Teaching Award (2013)** from Society for
College Science Teachers / National Science Teachers Association
Discussant, Physics and Biology Education Gordon Conference, 2014.
2014 **Boulder Faculty Assembly Teaching Excellence Award.**

Current Funding:

"Collaborative Research: Organic Chemistry, Life, the Universe and Everything (OCLUE)", Agency:
NSF DUE-1502552. M.M. Cooper, PI, M.W. Klymkowsky, Co-PI. (1 September 2015-31 August 2019)
\$250,000.

CU Chancellor's Award: "Evaluation of learning outcomes: comparing a introductory
and discovery lab courses in MCDB." total \$10,000 (2016-2019)

Recently completed

"Patterns of Wnt and Hedgehog signaling in human iPSC-derived euploid and trisomic 21 cerebral organoids. Linda Crnic Institute 1 April 2016 -31 March 2017. M.W. Klymkowsky, P.I. \$50,000 direct cost.

"BeSocratic: A Free-form, Interactive System to Investigate the Development of Representational Competence" TUES Co-PI: Michael W. Klymkowsky, Ph.D. (PI Melanie Cooper) Agency: National Science Foundation 10/1/11 9/30/16 - \$550,000

"Chemistry and the Logic of Life" Co-PI: Michael W. Klymkowsky, Ph.D. Agency: National Science Foundation (1 Sept. 2008 - 31 July 2013)(DUE 0816692). The goal of this project is to develop text, interactive materials, and assessments for a novel, research informed introductory approach to general chemistry. (\$500,000 total)

Principle Collaborator on supplement to Mark Winey's NIH grant (3R01GM074746 - 06W1) for studies on centrin and other basal body and centrosomal protein's developmental roles using the *Xenopus* embryo. 1 June 2012- 30 May 2015.

"Creating a Common Thermodynamics" DUE 1122818 Co-PI Michael W. Klymkowsky (PI Edward Redish) Agency: National Science Foundation. (end 31 Aug. 2014). The goal of this project is to develop materials for a physics course dealing with topics of particular relevance to biological sciences, specifically Thermodynamics and Statistical Mechanics. (\$600,000 total).

Proposals pending:

Co-PI. NSF. EHR CORE "ATICUS: Adaptive technology for improved cognition and understanding in STEM (submitted January 2019) \$1.5M requested.

Collaborator. NSF "Collaborative Research: Expanding the LibreTexts Libraries into the Next Generation Platform for Active Learning in STEM Education" (submitted December 2018). \$3M requested.

Co-PI. NSF. "Collaborative Research: Investigating the supports and barriers to propagating a curriculum across multiple learning environments" (submitted December 2018) \$2.6 M requested.

Proposals planned:

PI. NSF tentative title "Expansion microscopy studies of macromolecular assembly in *Xenopus laevis* embryos. planned Fall submission.

Blog Posts for the Public Library of Science (PLoS) - Science Education site:

<https://blogs.plos.org/scied/>

Research Publications (pubmed indexed publications are numbered, other publications are not): **ORCID ID:** 0000-0001-5816-9771

1. Cupp, J., M.W. Klymkowski (sic), J. Sands, A. Keith, & W. Snipes. 1975. Effect of lipid alkyl chain perturbations on the assembly of bacteriophage PM2. Bioch. Biophys. Act **389**: 345-57.

2. Ross, M.J., M.W. Klymkowsky, D.A. Agard & R.M. Stroud. 1977. Structural studies of a membrane-bound acetylcholine receptor from *Torpedo californica*. *J. Mol. Biol.* **116**:635-59.
3. Klymkowsky, M.W. & R.M. Stroud. 1979. Immunospecific identification and three-dimensional structure of a membrane-bound acetylcholine receptor from *Torpedo californica*. *J. Mol. Biol.* **128**: 319-334.
4. Klymkowsky, M.W., J.E. Heuser & R.M. Stroud. 1980. Protease effects on the structure of acetylcholine receptor membranes from *Torpedo californica* electroplaques. *J. Cell Biol.* **85**: 823-838.
5. Klymkowsky, M.W. 1981. Intermediate filaments in 3T3 cells collapse after the intracellular injection of a monoclonal anti-intermediate filament antibody. *Nature* **291**: 248-251.
6. Kistler, J., R.M. Stroud, M.W. Klymkowsky, R. LaLancette & R.H. Fairclough. 1982. Structure and function of an acetylcholine receptor. *Biophys. J.* **37**: 371-383.
7. Lane, E.B. & M.W. Klymkowsky. 1982. Epithelial tonofilaments: investigating their form and function using monoclonal antibodies. *Cold Spring Harbor Symp. Quant. Biol.* **46**: 387-402.
8. Klymkowsky, M.W. 1982. Vimentin and keratin intermediate filament systems in culture PtK₂ epithelial cells are interrelated. *EMBO J.* **1**: 161-165.
9. Klymkowsky, M.W., R.H. Miller & E.B. Lane. 1983. Morphology, behavior, and interaction of cultured epithelial cells after the antibody-induced disruption of keratin filament organization. *J. Cell Biol.* **96**: 494-506.
10. Klymkowsky, M.W. & D.J. Plummer. 1985. Giant axonal neuropathy: A conditional mutation affecting cytoskeletal organization. *J. Cell Biol.* **100**: 245-250.
11. Rubin LL, Chalfin NA, Adamo A, & M.W. Klymkowsky. 1985. [Cellular and secreted forms of acetylcholinesterase in mouse muscle cultures.](#) *J Neurochem.* **45**:1932-40
- Carroll, S.B., P.D. Riley, M.W. Klymkowsky, J. Van Blerkom, J. Stewart & M.P. Scott. 1986. Localization of homoeodomain-containing proteins using antibodies against synthetic oligopeptides. in *Gametogenesis & the Early Embryo*. pp.257-270. Alan R. Liss.
12. Klymkowsky, M.W., L.M. Maynell & A.G. Polson. 1987. Polar asymmetry in the organization of the cortical cytokeratin system of *Xenopus laevis* oocytes & embryos. *Development.* **100**: 543-557.
- Chu, D. & M.W. Klymkowsky. 1987. Experimental analysis of cytoskeletal function in early *Xenopus laevis* embryos. in *First Int. Symp. Cytoskeleton & Development*. ICSU press.8: 140-142.
- Klymkowsky, M.W., E. Christian, R.G. Ham, D.J. Plummer & F. Sprenger. 1988. Giant axonal neuropathy, intermediate filaments and cellular metabolism. in *Intrinsic Determinants of Neuronal Form*. Alan R. Liss, Inc., pp. 441-459.
13. Murti KG, Goorha R, & Klymkowsky MW. 1988. [A functional role for intermediate filaments in the formation of frog virus 3 assembly sites.](#) *Virology.*162:264-9.
14. Klymkowsky, M.W. 1988. Metabolic inhibitors and intermediate filament organization in cultured human fibroblasts. *Exp. Cell Res.* **174**: 282-290.
- Dent, J.A. & M.W. Klymkowsky. 1989. Whole-mount analyses of cytoskeletal reorganization & function during oogenesis and early embryogenesis in *Xenopus*. in *The Cell Biology of Fertilization*. H. Schatten & G. Schatten, eds. *Monographs in Cell Biology*. Academic Press. pp. 63-103.
15. Dent, J.A., A.G. Polson & M.W. Klymkowsky. 1989. A whole-mount immunocytochemical analysis of the expression of the intermediate filament protein vimentin in *Xenopus*. *Development* **105**: 61-74.
16. Klymkowsky, M.W., J.B. Bachant & A. Domingo. 1989. Functions of intermediate filaments. *Cell Motil. Cytoskeleton.* **14**: 309-331.

17. Klymkowsky, M.W. & L.A. Maynell. 1989. MPF-induced breakdown of cytokeratin filament organization in the maturing *Xenopus* oocyte depends upon the translation of maternal mRNAs. *Devel. Biol.* **134**: 479-485.
18. Chu, D.T.W. & M.W. Klymkowsky. 1989. The appearance of acetylated α -tubulin during early development and differentiation in *Xenopus*. *Devel. Biol.* **136**: 104-117.
19. Marazzi G, Bard F, Klymkowsky MW, & L.L. Rubin. 1989. [Microinjection of a monoclonal antibody against a 37-kD protein \(tropomyosin 2\) prevents the formation of new acetylcholine receptor clusters.](#) *J Cell Biol.* **109**:2337-44.
- Kay, B.K., J.P. Evans, E.C. Stephenson, M.L. King, M.W. Klymkowsky, D.L. Gard, J.M. Holy, R.P. Elinson, S. Strome & E.C. Raff. 1991. The cytoskeletons of gametes, eggs, & early embryos. in Cell-cell interactions in early development. *Soc. Devel. Biol. Symp.* 297-319.
20. Klymkowsky, M.W., L.A. Maynell & C. Nislow. 1991. Cytokeratin phosphorylation, cytokeratin filament severing, and the solubilization of the maternal mRNA Vg1. *J. Cell Biol.* **114**: 787-797.
21. Klymkowsky MW. 1991. [Intermediate filaments. Getting under the skin.](#) *Nature.* **354**:264.
22. Klymkowsky, M.W. & J. Hanken. 1991. Whole-mount staining of *Xenopus* and other vertebrates. in *Xenopus laevis*: Practical uses in cell and molecular biology. B.K. Kay & H.B. Peng, eds. *Meth. Cell Biol.* **36**: 413-435. Academic Press.
23. Maynell, L., K.A. Kirkegaard & M.W. Klymkowsky. 1992. Brefeldin A inhibits poliovirus RNA synthesis. *J. Virol.* **66**: 1985-1994.
24. Klymkowsky, M.W., D.R. Shook & L.A. Maynell. 1992. Evidence that the deep keratin filament system of the *Xenopus* embryo acts to ensure normal gastrulation. *Proc. Natl. Acad. Sci. USA* **89**: 8736-8740.
25. Dent JA, Cary RB, Bachant JB, Domingo A, & M.W. Klymkowsky. 1992. [Host cell factors controlling vimentin organization in the *Xenopus* oocyte.](#) *J Cell Biol.* **119**:855-66.
26. Hanken J, Klymkowsky MW, Summers CH, Seufert DW & N. Ingebrigtsen. 1992. [Cranial ontogeny in the direct-developing frog, *Eleutherodactylus coqui* \(Anura: Leptodactylidae\), analyzed using whole-mount immunohistochemistry.](#) *J. Morphol.* **211**:95-118.
27. Klymkowsky, M.W. & A. Karnovsky. 1994. Morphogenesis and the cytoskeleton: Studies of the *Xenopus* embryo. *Devel. Biol.* **126** 372-384.
28. Seufert DW, Hanken J, & M.W. Klymkowsky. 1994. [Type II collagen distribution during cranial development in *Xenopus laevis*.](#) *Anat Embryol (Berl).* **189**:81-9.
29. Cary, R.B. & M.W. Klymkowsky. 1994a. Desmin organization during the differentiation of the dorsal myotome in *Xenopus laevis*. *Differentiation*, **56**:31-38.
30. Cary, R.B. & M.W. Klymkowsky. 1994b. Differential organization of desmin and vimentin in muscle is due to differences in their head domains. *J. Cell Biol.*, **126**: 445-456.
31. Doedens J, Maynell LA, Klymkowsky MW, & K. Kirkegaard. 1994. [Secretory pathway function, but not cytoskeletal integrity, is required in poliovirus infection.](#) *Arch Virol Suppl*; **9**:159-72.
32. Cary RB, Klymkowsky MW, Evans RM, Domingo A, Dent JA, & L.E. Backhus 1994. [Vimentin's tail interacts with actin-containing structures in vivo.](#) *J Cell Sci.* **107**:1609-22.
33. Cary, R.B. & M.W. Klymkowsky. 1995. Disruption of intermediate filament organization leads to structural defects at the intersomite junction in *Xenopus* myotomal muscle. *Development*, **121**: 1041-1052.
- Klymkowsky, M.W. & R.M. Evans. 1995. Intermediate filaments in human pathology. in *Principals of Medical Biology*. E.E. Bittar and N. Bittar, editors. JAI Press, Inc. pp. 147-186.

34. Karnovsky, A. & M.W. Klymkowsky. 1995. Anterior axis duplication in *Xenopus* induced by the over-expression of the cadherin-binding proteins plakoglobin. Proc. Natl. Acad. Sci. USA , **92**: 4522-4526.
35. Klymkowsky, M.W. 1995. Intermediate filaments: new proteins, some answers, more questions. Curr. Op. in Cell Biol. **7**: 46-54.
36. Klymkowsky, M.W. & B. Parr. 1995. The body language of cells: the intimate connection between cell adhesion and behavior. Cell **83**:5-8.
37. Bachant, J.B. & M.W. Klymkowsky. 1996. A non-tetrameric species is the major soluble form of keratin in *Xenopus* oocytes and rabbit reticulocyte lysates. J. Cell Biol., **132**: 153-165.
38. Klymkowsky, M.W. 1996. Intermediate filaments as dynamic structures. in Intermediate filaments and cancer, edited by Mary Hendrix, Cancer and Metastasis Reviews **15**: 417-428.
- Klymkowsky, M.W. 1997. Minireviews, minidogmas, and mythinformation. Bioessays, **19**: 537-539.
39. Merriam, J., A. Rubenstein & M.W. Klymkowsky. 1997. Cytoplasmically-anchored plakoglobin induces a WNT-like phenotype in *Xenopus*. Devel. Biol., **185**: 67-81.
40. Rubenstein, A., J. Merriam & M.W. Klymkowsky. 1997. Localizing the adhesive and signaling unctions of plakoglobin. Dev. Genet. **20**: 91-102.
41. Hanken J, Klymkowsky MW, Alley KE, & D.H. Jennings DH. 1997. [Jaw muscle development as evidence for embryonic repatterning in direct-developing frogs.](#) Proc Biol Sci. **264**:1349-54.
42. Kofron M, Spagnuolo A, Klymkowsky M, Wylie C, Heasman J. 1997. [The roles of maternal alpha-catenin and plakoglobin in the early Xenopus embryo.](#) Development. **124**:1553-60.
- Gelderloos, J.A., L.L. Witcher, P. Cowin & M.W. Klymkowsky. 1997. Plakoglobin: the other ARM of vertebrates, in Cell Adhesion & Intracellular Signaling, P. Cowin & M.W. Klymkowsky, eds. Landes Bioscience, 13-30.
- Bachant, J.B. & M.W. Klymkowsky. 1997. Injection of *Xenopus* oocytes and embryos. in Cells: A laboratory Manual,ed. D.L. Spector, R. Goldman & L.A. Leinwand, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY11803. Volume 2, pp 84.1-84.7.
43. Gard, D.L. & M.W. Klymkowsky. 1998. Intermediate filaments in the *Xenopus* oocytes and early embryo, in Subcellular Biochemistry 31:Intermediate filaments, H. Herrmann, ed. Plenum., pp. 35-70.
- Carl, T. & M.W. Klymkowsky. 1999. Whole-mount visualization of endogenous and exogenous proteins in *Xenopus* and other organisms. in "A comparative methods approach to the study of oocytes and embryos. Advances in Molecular Biology Series., J. Richter, Ed. Oxford University Press, New York. pp. 291-315.
44. Klymkowsky MW.1999. [Plakophilin, armadillo repeats, and nuclear localization.](#) Microsc Res Tech. **45**:43-54.
45. Carl, T.F., C. Dufton, J. Hanken & M.W. Klymkowsky. 1999. Inhibition of neural crest migration in *Xenopus* using anti-sense-Slug RNA. Devel. Biol. **213**:101-115.
46. Klymkowsky, M.W., B.O. Williams, G.D. Barish, H.E. Varmus & Y.E. Vourgourakis. 1999. Analysis of membrane-anchored plakoglobins reveals multiple mechanisms of action in Wnt signaling. Mol. Biol., of the Cell, **10**: 3151- 3169.
47. Zorn, A.M., G. Barish, B.O. Williams., P. Lavender, M. W. Klymkowsky* & H E. Varmus*. 1999. Regulation of Wnt signaling by a SOX protein: XSOX17a/β and XSox3 physically interact β-catenin. Molecular Cell, **4**:487-498. (*equal contribution).

48. Klymkowsky, M.W. 1999. Weaving a tangled web: the interconnected cytoskeleton. Nature Cell Biology, **1**:121-123.
- Carl, T.F., Y. Vourgourakis, M. W. Klymkowsky & J. Hanken. 2000. Green fluorescent protein used to assess cranial neural crest derivatives in the frog, *Xenopus laevis*. in "Regulatory Processes in Development: The Legacy of Sven Horstadius". Editors: C.-O. Jacobson, L. Olsson, & T. Laurent. Portland press. Pp.167-172.
49. Williams, B.O., G.D. Barish, M. W. Klymkowsky & H. E. Varmus. 2000 A comparative evaluation of β -catenin and Plakoglobin Signaling Activity. Oncogene. **19**:5720-8.
50. St. Amand, A. & M.W. Klymkowsky. 2001. Cadherins and catenins, Wnts and SOXs: embryonic patterning in *Xenopus*. Int. Rev. Cytol. **203**:291-355.
- Klymkowsky, M.W. 2001. Selling cellular gels. A review of Gerald Pollack's Cells, Gels and the Engines of Life. Nature Cell Biology.**3**:E213.
51. Hanken J, Carl TF, Richardson MK, Olsson L, Schlosser G, Osabutey CK, & M.W. Klymkowsky. 2001. Limb development in a "nonmodel" vertebrate, the direct-developing frog *Eleutherodactylus coqui*. J Exp Zool. **291**:375-88.
52. Schweitzer SC, Klymkowsky MW, Bellin RM, Robson RM, Capetanaki Y, & R.M. Evans. 2001. Paranemin and the organization of desmin filament networks. J Cell Sci. **114**:1079-89.
53. Haubold K, Herrmann H, Langer SJ, Evans RM, Leinwand LA, & M.W. Klymkowsky. 2003. Acute effects of desmin mutations on cytoskeletal and cellular integrity in cardiac myocytes. Cell Motil Cytoskeleton. **54**:105-21.
54. Klymkowsky, M.W., K. Garvin-Doxas & M. Zeilik. 2003. Bioliteracy & Teaching Efficacy: What Biologists can Learn from Physicists. Cell Biol. Education, **2**:155-161.
55. Zhang, C., T. Basta, E. Jensen & M.W. Klymkowsky. 2003. The β -catenin/VegT-regulated early zygotic gene *Xnr5* is a direct target of SOX3 regulation. Development, **130**: 5609-5624.
56. Fawcett, S.R. & M.W. Klymkowsky. 2004 Expression of the SOX7 transcription factor during *Xenopus laevis* embryonic development. Gene Expression Report. **4**: 29-33.
57. Zhang, C., T. Basta, A.-L. Hernandez, P. Simpson, D. Stemple, K.B. Artinger & M.W. Klymkowsky. 2004. Repression of nodal expression by maternal B1-type SOX regulates of germ layer formation in *Xenopus* and Zebrafish. Devel. Biol., **273**: 23-37.
58. Zhang, C., T. Basta, S.R. Fawcett & M.W. Klymkowsky. 2005. SOX7 is an immediate-early target of VegT and regulates Nodal-related gene expression in *Xenopus*. Devel. Biol. **278**: 526-541.
59. Zhang, C., T. Basta, & M.W. Klymkowsky. 2005. SOX7 and SOX18 are essential for cardiogenesis in *Xenopus*. Dev. Dynamics. **234**:878-891.
60. Klymkowsky, M.W. 2005. β -catenin and its regulatory network. Hum. Path. **36**:225-227.
61. Klymkowsky, M.W. 2005. Points of view: content versus process: is this a fair choice? Can nonmajors courses lead to biological literacy? Do majors courses do any better? CBE Life Science Education. **4**:196-198.
- Klymkowsky, M.W. 2005. Wnt signaling networks and embryonic patterning. In: Savagner P, ed. Rise and fall of epithelial phenotype. Austin: RG Landes Co. pp.267-288.
62. Wang, T.-W., G.P. Stromberg, J.T. Whitney, N.W. Brower, M.W. Klymkowsky & J.M. Parent. 2006. SOX3 expression identifies neural progenitors in persistent neonatal and adult mouse forebrain germinative zones. J. Comp. Neurol. **497**:88-100.
63. Zhang, C., Timothy F. Carl, E. Trudeau, Thomas Simmet & M.W. Klymkowsky. 2006. An NF- κ B and Slug regulatory loop active in early vertebrate mesoderm. PLoS ONE, **1**:e106 (1-14).

64. Klymkowsky, M.W., Taylor, L.B., S.R. Spindler, & K. Garvin-Doxas. 2006. Two-dimensional, implicit confidence tests as a tool for recognizing student misconceptions. *J. College Science Teaching* **36**:44-48.
65. Klymkowsky, M.W. 2007. Teaching without a textbook: a strategy to focus learning. *CBE Life Science Education*. **6**: 190-193.
66. Zhang, C, & M.W. Klymkowsky, 2007. The Sox Axis, Nodal Signaling and Germ Layer Specification. *Differentiation*. **75**:536-45.
67. Garvin-Doxas, K., M.W. Klymkowsky & S. Elrod. 2007. Building, using, and maximizing the impact of concept inventories in the biology education: a meeting report. *CBE Life Science Educ*, **6**: 277-282.
- Garvin-Doxas, K., I. Doxas & M.W. Klymkowsky. 2007. Ed's Tools: A web-based software toolset for accelerated concept inventory construction. Proceedings of the National STEM Assessment of Student Achievement conference.
68. Cortez-Rossi, C., L. Hernandez-Lagunas, C. Zhang, I.F. Choj, L. Kwok, M.W. Klymkowsky & K.B. Artinger. 2008. Rohon-Beard sensory neurons are induced by BMP4 expressing non-neuronal ectoderm in *Xenopus laevis*. *Developmental Biology*, **314**:351-61.
69. Klymkowsky, M.W. & K. Garvin-Doxas. 2008. Recognizing Student Misconceptions through Ed's Tool and the Biology Concept Inventory. *PLoS Biology*, **6**: e3.
70. Garvin-Doxas, K. & M.W. Klymkowsky. 2008. Understanding Randomness and its impact on Student Learning: Lessons from the Biology Concept Inventory (BCI). *CBE Life Science Education*, **7**:227-233.
71. Schlosser, G., T. Awtry, S.A. Brugmann, E.D. Jensen, K. Neilson, G. Ruan, A. Stammler, D. Völker, B. Yan, C. Zhang, M.W. Klymkowsky, & Sally A. Moody. 2008. Eya1 and Six1 neurogenesis in the cranial placodes in a SoxB1-dependent fashion. *Devel. Biol.* **320**:199-214.
- Klymkowsky, M.K. & E.M. Furtak. 2009. [How the incoherent state of science and mathematics education undermines biological \(and scientific\) literacy](#). Colorado Higher Education News.
72. Zhang, C. & M.W. Klymkowsky. 2009. Unexpected functional redundancy between Twist and Slug (Snail2) and their feedback regulation of NF-κB via Nodal and Cerberus. *Devel. Biol.* **331**:340-9.
73. Klymkowsky, M.W. & P. Savagner. 2009. Epithelial-mesenchymal transition (EMT): a cancer researcher's conceptual friend and foe. *American Journal of Pathology*. **174**:1588-93.
74. Klymkowsky M.W. 2009. [Make room for computing](#). *Science*. **326**:227 (letter).
- Klymkowsky, M.W. 2009. A guide to the productive poking, prodding and injection of cells. *Development* **136**:4070-4072.
75. Cooper, M.M., N. Grove, S. Underwood & M.W. Klymkowsky. 2010 Lost in Lewis Structures: an investigation of student difficulties in developing representational competence. *J. Chem Ed.*, DOI: **10.1021/ed900004y**.
76. Klymkowsky, M.W. 2010. Thinking about the conceptual foundations of the biological sciences. *CBE Life Science Educ.* **9**: 405-7.
77. Klymkowsky, M.W., C. Cortez-Rossi, & K.B. Artinger. 2010 [Mechanisms driving neural crest induction and migration in the zebrafish and *Xenopus laevis*](#). *Cell Adhesion & Migration*, **4**: 595-608.
78. Hikasa, H., J. Ezan, X. Li, M.W. Klymkowsky & S. Sokol. 2010. [Wnt-dependent phosphorylation of TCF3 leads to transcriptional derepression during vertebrate anteroposterior axis specification](#). *Dev. Cell*, **9**:521-32.

79. Klymkowsky, M.W., S. Underwood, & R.K. Garvin-Doxas. 2010. [The Biological Concepts Instrument \(BCI\), a diagnostic tool to reveal student thinking](#). arXiv:1012.4501v1
80. Shi, J., J. Power & M.W. Klymkowsky. 2010. Revealing student thinking about experimental design and the roles of control experiments. *Int. J. Teaching Biol.* 5:<http://hdl.handle.net/10518/3647>
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