

Huân M. Ngô

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PERSONAL STATEMENT

A scientist can serve society and humanity in three ways: to discover and create new knowledge, to educate the young and the public, and to improve the human and life conditions. **First**, I contribute to our scientific knowledge including: 1). Exploration of biological diversity in aquatic ecosystems, 2). Uncovering of novel features in cytoskeleton, motility and membrane trafficking in unicellular organisms, 3). Codiscovery of RNA interference (RNAi) in African trypanosomes, 4). Unraveling pathological gene networks in human induced by brain parasitism by *Toxoplasma*, and 5). Building a foundation of protein crystallographic structures to study how the brain parasite lives in human. **Second**, I educate younger generations by classroom teaching and program development, spanning a continuum of learning levels from middle to medical schools, promoting science education of our urban population. **Third**, I work for cures of common brain diseases. *Toxoplasma* is a brain parasite infecting over 2 billion humans on Earth. I develop a new hypothesis using data generated by collaborators. We correlate brain parasitism to several brain diseases (Brain Cancer, Epilepsy, Huntington's and Alzheimer's diseases). The protein crystallographic structures provide a roadmap to find drugs and kill the parasite. **Last**, we must act to the urgent threats of the 21st century. Humans are breaching the tipping points of the Nine Planetary Boundaries, including Global Warming. These destructive trends must stop for the survival of humanity and life on earth. I contribute to local and state planning for climate change.

EDUCATION

1983-1986	B.A. in Microbiology, B.A. in Human Physiology , University of Minnesota
1987-1989	M.S. in Botany , University of Tennessee
1990-1996	Ph.D. in Biology , University of Illinois at Chicago
1997-2001	Postdoctoral Training in Cellular & Molecular Parasitology , Yale University School of Medicine
2007-2010	Re-Entry Training in Neurobiology & Structural Genomics , Northwestern University School of Medicine
2010-2015	Self-Training in Structural Biology, Systems Biology & Environmental Sciences , New Haven
2016	Online-Training in Drug Development, Clinical Trials and Management , New Haven

SCIENTIFIC TRAINING

1983-1984	Psychiatric Assistant , Psychiatric Units, University of Minnesota Hospitals.
1984-1986	Research Assistant with Andrew Streifel and Dr. Frank Rhame, Department of Environmental Health and Safety, University of Minnesota Hospitals. Independent Scientist with Drs. Gerald W. Prescott, Lois Pfeister, and David Czarnecki, Lake Itasca Biological Station Summer Program, U. of Minnesota
1986	Clinical Technologist with Dr. Nancy Reinsmoen, Department of Clinical Immunology, University of Minnesota Hospitals.
1987-1989	Master student with Dr. Patricia Walne, Department of Botany, University of Tennessee
1990-1996	Doctorate student with Dr. G. Benjamin Bouck, Department of Biological Sciences, University of Illinois at Chicago
1996-2001	Postdoctoral Fellow with Dr. Keith Joiner, Infectious Diseases Section, Yale University School of Medicine Associate Research Scientist with Dr. Keith Joiner, Infectious Diseases Section, Yale University School of Medicine
2006-2007	Independent Scientist , to develop a <i>Toxoplasma</i> infection etiological model for brain diseases
2008	Assistant Research Professor , affiliated with Dr. Richard J. Miller, Department of Molecular Pharmacology and Biological Chemistry, Robert Lurie Medical Research Center, Northwestern University

- 2009-2012 **Assistant Research Professor**, affiliated with Dr. Wayne F Anderson, Department of Molecular Pharmacology and Biological Chemistry, Center for Structural Genomics of Infectious Diseases, Northwestern University
Research Scientist, affiliated with Dr. Rima McLeod, University of Chicago Medical School
- 2012-2017 **Science Consultant**, BrainMicro LLC, New Haven, Connecticut
Affiliate, Center for Structural Genomics of Infectious Diseases, Northwestern U.

SCIENCE EDUCATION/TEACHING

- 1985-1986 **Undergraduate Teaching Assistant** with Drs. David Parmelee and Kathleen Peterson, University of Minnesota, [Coordinator of Biology Colloquium]
- 1987 **Graduate Teaching Assistant**, Department of Botany, University of Tennessee [General Biology Laboratory]
- 1990-1996 **Graduate Teaching Assistant** with Drs. Michael Cummings and Leo Miller, Department of Biological Sciences, University of Illinois at Chicago [developed interactive learning for General Biology and Genetics Laboratories]
Graduate Teaching Assistant with Dr. John Lussenhof, Howard Hughes Undergraduate Honors Biology Workshop, [implemented Triesman problem based learning in freshman Biology for underrepresented population]
Founder and Coordinator, with Drs. Sidney Simpson and Robert Willey, UIC Undergraduate Biology Colloquium, University of Illinois at Chicago, [installed a replication of the U. Minnesota Biology Colloquium based on Applied & Team Learning pedagogy]
- 2002-2006 **Teacher**, Science Lab, G5-8, Sheridan Communication and Technology Middle School, New Haven Public Schools, [developed a model STEM program for an 'inner-city' school, centered with the NASA Explorer School theme]
Science Consultant, New Haven Public Schools
Adjunct Professor, Gateway Community College & U. of Connecticut at Stamford

SUMMER TRAINING

- 1984-1989 Lake Itasca Biological Station, University of Minnesota
- 1988 Friday Harbor Marine Laboratories with Dr. Robert Waaland, University of Washington
- 2002 Alternate Route to Certification, Connecticut Department of Higher Education, Teaching Certification in Biology, Grade 7-12.
- 2003-2004 NASA Educational Workshops: **AstroBiology** - Ames Space Center, CA; **Mars Exploration** - Atlanta, GA; **Coalitions in Science, Math and Technology** - Baltimore, MD; **NASA Team Leadership Workshop** - Seattle, WA; **NASA Explorer School Action Planning**, Goddard Space Flight Center, MD

HONORS & AWARDS

- 1986 **President's Student Leadership and Service Recognition Award**, University of Minnesota
- 1995 **The First Department of Biological Sciences Special Services Award**, University of Illinois at Chicago
- 2004 **Bayer Science Forum Excellence in Teaching Award**
- 2005 **Teaching in Space Award**, Johnson Space Center, a live downlink from the International Space Station to Sheridan NASA Explorer School

GRANTS & FELLOWSHIP

- 1984-1985 **Field Biological Program Research Award**, University of Minnesota
- 1985 **Undergraduate Research Opportunities Award**, University of Minnesota
- 1988-1989 **Science Alliance Research Fellowship**, University of Tennessee
- 1989 **Friday Harbor Laboratories Marine Science Scholarship**, U. of Washington
- 1991 **Psychological Society of America Grants-in-Aid Research Award**

- 1993-1994 **Laboratory for Molecular Biology Graduate Fellowship**, University of Illinois at Chicago
- 1997-1998 **Institutional National Research Service Award**, Parasitology Training Grant, Yale University, NIAID (5T32AI07404)
- 1999-2001 **Individual National Research Service Award**, National Institute of Health, NIAID, (5F32AI10044)
- 2003-2006 **NASA Explorer School**, PI/Team Lead of NASA award to Sheridan School
- 2004-2005 **NASA Partnerships for Sustainability Grant**, co-PI
- 2007-2010 **Supplement to Promote Reentry into Biomedical and Behavioral Research Careers**, National Institute of Health, NIDA, (3R01DAO13141-08S1)
- 2009 **NARSAD Distinguished Investigator Award (to R.J. Miller)**, HMN is grant writer and co-principal investigator.
- 2011 **NGM Structural Genomic Consortium**. A Consortium for Brain Microbiology, request for \$10.8M, a consortium grant that includes Northwestern University, University of Chicago, University of Pennsylvania and California Pacific Medical Center in San Francisco. HMN is primary grant writer, the proposal is *unsuccessful* but HMN completed the primary purpose of constructing a framework of research vision and implementation. These integrative ideas are being shared and pursued by senior collaborators of the proposed consortium.

PUBLICATION

Airborne Fungal Pathogen

1. Streifel A.J., **Ngô H.M.** and Juni B.A. (1986) Airborne filamentous fungal spore counts during various in-hospital construction projects. American Society for Microbiology, 86th Annual Meeting, Washington D.C. (poster) – undergraduate.
2. Sigford R., **Ngô H.**, Streifel A.J., Rubow A.K., Marple R. and Blumenthal M. (1986) Evaluation of indoor and outdoor aeroallergens. Academy of Allergy and Immunology Educational Conference, New Orleans, LA (poster) – undergraduate.
3. Rhame F.S., **Ngô H.**, Juni, B. and Streifel, A. (1986) Impact of human activity on airborne microorganisms and particles in a new hospital. 25th Meeting of Interscience Conference on Antimicrobial Agents and Therapy, New Orleans, LA, (poster) – undergraduate.

Algal Diversity

1. **Ngô H.M.**, Prescott G.W. and Czarnecki D.B. (1987) Additions and confirmations to the algal flora of Itasca State Park. I. Desmids and Diatoms from North Deming Pond. *J. Minn. Acad. Sci.*, 52:14-26
2. **Ngô H.M.** and Pfeister L.P. (1990) The freshwater dinoflagellates of North Deming Pond, Itasca State Park, U.S.A. *Trans. Am. Microsc. Soc.*, 109: 380-98
3. **Ngô H.M.** and Wujek D.E. (1993) Scaled chrysophytes of Lake Itasca State Park. III. Additions to the flora. *J. Minn. Acad. Sci.*, 57:15-18

Electron Microcopy of Protozoan

1. **Ngô H.M.** and Walne P.L. (1989) Ultrastructural characterization of the flagella in *Peridinium inconspicuum*. J. Phycol. 25:19a (talk) – master thesis, advisor was in poor health.
2. **Ngô H.M.** and Walne P.L. (1990) Structural organization of the contractile transverse flagellum in *Peridinium inconspicuum*. J. Phycol. 26:28a (talk) – master thesis, advisor was in poor health.
3. **Ngô H.M.** and Walne P.L. (1990) Microarchitecture and evolutionary implications of the flagellar paraxial rod in *Peridinium inconspicuum*. International Society for Evolutionary Protistology 8th Biennial Conference, College Park, MD (talk)
4. Triemer R.E. and **Ngô H.M.** (1990) Ultrastructural features of *Calycimonas*. J. Phycol. 26:20a (poster)

Biochemistry, Cellular and Molecular Biology of Protozoan

Flagellar Apparatus and Cytoskeleton

1. **Ngô H.M.** and Bouck G.B. Isolation of *Euglena* flagella. (1995) In: Dentler D.L. and Witman G. (eds) *Eukaryotic Cilia and Flagella. Methods in Cell Biology*. Academic Press, pp. 25-

30

2. **Ngô H.M.** and Bouck G.B. (1995) Isolation of flagellar paraxonemal rod proteins. In: Dentler D.L. and Witman G. (eds) *Eukaryotic Cilia and Flagella. Methods in Cell Biology*. Academic Press, pp. 355-60
3. Bouck G.B. and **Ngô H.M.** (1996) Cortical structure and function in euglenoids with references to trypanosomes, ciliates and dinoflagellates. *Int. Rev. Cytology* 169: 267-318
4. **Ngô H.M.** and Bouck G.B. (1998) Heterogeneity and a coiled-coil prediction of trypanosomatid-like flagellar rod proteins in *Euglena*. *J. Euk. Microbiol.* 45(3): 323-333

Molecular Biology of Parasitic Protozoan

RNA Metabolism of African Trypanosome

1. **Ngô H.M.**, Tschudi C., Gull K. and Ullu E. (1998) Double-stranded RNA induces mRNA degradation in *Trypanosoma brucei*. *Proc. Natl. Acad. Sci. (USA)* 95: 14687-14692
2. Shi H., Dijenk A., Chamond N., **Ngô H.**, Tschudi C. and Ullu E. (2005) Repression of gene expression by the coliphage MS2 coat protein in *Trypanosoma brucei*. *Mol. Biochem. Parasitol.* 144:119-22.

Cell Biology of Parasitic Protozoan

Membrane Trafficking and Organelle Biogenesis in the Brain Parasite *Toxoplasma*

1. **Ngô H.M.**, Hoppe H. and Joiner K.A. (2000) Differential sorting and post-secretory targeting of proteins in parasitic invasion. *Trends Cell Biol.* 10: 67-72
2. Hoppe H., **Ngô H.M.**, Yang M. and Joiner K.A. (2000) Targeting to rhoptry organelles of *Toxoplasma gondii* involves evolutionary conserved protein sorting mechanism. *Nature Cell Biol.*, 2: 449-456
3. **Ngô H.M.**, Ngo E.O. and Joiner K.A. (2000) *Toxoplasma gondii*: Are host cell nucleotides a direct source for purine salvage? *Exp. Parasitol.*, 95:148-53
4. Liendo A., Stedman T.S., **Ngô H.M.**, Hoppe H.C. and Joiner K.A. (2001) *Toxoplasma gondii* ADP-ribosylation factor 1 mediates enhanced release of constitutively secreted dense granules. *J. Biol. Chem.*, 276:18272-81
5. Robibaro R., Hoppe H.C., **Ngô H.M.**, Yang M., Coppens I. Stedman T., Paprotka K. and Joiner K.A. (2001) Endocytosis in different lifestyles of protozoan parasitism: role in nutrient uptake with special reference to *Toxoplasma gondii*. *Int. J. Parasitol.*, 31:1343-53
6. Robibaro R., Stedman T., Coppens I., **Ngô H.M.**, Pypaert M., Nam H.-W. and Joiner K.A. (2002) *Toxoplasma gondii* Rab5 enhances cholesterol acquisition from host cells. *Cellular Microbiol.*, 4:139-52
7. Pelletier L., Stern C.A., Pypaert M., Sheff D., **Ngô H.M.**, Roper N., He C.Y., Hu K., Toomre D., Coppens I., Roos D.S., Joiner K.A. and Warren G. (2002) Golgi biogenesis in *Toxoplasma gondii*. *Nature* 418:548-52.
8. Que X., **Ngô H.M.**, Liu Q., Brinen L., Herdman S., Hirata K., Joiner K.A. and Reed S.L. (2002) The cathepsin B of *Toxoplasma gondii*, *toxopain-1*, is critical for parasitic invasion and rhoptry protein processing. *J. Biol. Chem.* 277:25791-7.
9. **Ngô H.M.** / Yang M., Pypaert M., Hoppe H.C. and Joiner K.A. (2003) Biogenesis of secretory organelles in an apicomplexan parasite is dependent on the AP-1 adaptin. *J. Biol. Chem.* 278:5343-52
10. **Ngô H.M.** / Nakaar V., Aaronson E.P., Coppens I., Stedman T.T. and Joiner K.A. (2003) Pleiotrophic effect due to targeted depletion of secretory rhoptry protein ROP2 in *Toxoplasma gondii*. *J. Cell Sci.* 116:2311-20.
11. **Ngô H.M.**, Yang M. and Joiner, K.A. (2004) Are apicomplexan rhoptries secretory granules or secretory lysosomal granules? *Molecular Microbiol.* 52:1531-41.

Structural Biology of Brain Parasitism

Brain Cyst Proteins of *Toxoplasma*

1. Tonkin M.L., Halavaty A.S., Ramaswamy R., Ruan J., Igarashi M., **Ngô H.M.**, Boulanger M.J. (2015) Structural and functional divergence of the aldolase fold in *Toxoplasma gondii*. **J Mol Biol.** 427:840-52.
- 2.* Ruan J., Mouveaux T., Light S.H., Minasov G., Anderson W.F., Tomavo S.* and **Ngô H.M.*** (2015) The structure of bradyzoite-specific enolase from *Toxoplasma gondii* reveals insights into its dual cytoplasmic and nuclear functions. **Acta Crystallogr. D Biol. Crystallogr.** 71:417-26.
- 3.* Dubey R., B.L. Staker, I.T. Foe, M. Bogoyo, P.J. Myler, **Ngô H.M.*** and M.J. Gubbels*. (2017) Membrane skeletal association and post-translational allosteric regulation of *Toxoplasma gondii* GAPDH1. **Mol. Microbiol.** 103: 618-634

Systems Synthesis of Brain Parasitism.

Toxoplasma-Human Brain Interactions.

1. Ngô H.M. and Miller R.L. (2008) *In vitro* effects of neurogenesis by *Toxoplasma* infection of neural stem/progenitor cells. 19th Molecular Parasitology Meeting, Woods Hole, MA (talk)
2. Ngô H.M., Ruan J., Myler P., and Anderson W.F. (2010) Structural Genomics of the Brain Parasite *Toxoplasma* for Structure Aided Drug Discovery. 21th Molecular Parasitology Meeting, Woods Hole, MA.
- 3.* **Ngô H.M.***, Zhou Y., Lorenzi H., Wang K., Kim T.K., Zhou Y., El Bissati K., Mui E., Fracek L., Rajagopala S.V., Roberts C.W., Henriquez F.L., Montpetit A., Blackwell J.M., Jamieson S.E., Hargrave A., Melo M., Saeij J., Wheeler K., Naranjo-Galvis C., Begeman I.J., Alliley-Rodriguez N., Davis R.G., Soroceanu L., Cobb C., Steindler D.A., Boyer K., Noble A.G., Swisher C.N., Heydemann P.T., Rabiah P., Withers S., Soteropoulous P., Anderson W.F., Hood L., and R. McLeod1*. (2017) *Toxoplasma* Modulates Signature Pathways of Human Epilepsy, Neurodegeneration and Cancer, **Scientific Reports 7, Article number: 11496.**

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IN THE NEWS

- “Major Commitment to Biology Majors”, Chicago Tribune, April 18, 1993
- “Students in a Class of Their Own”, UIC News, April 14, 1993
- “Ngô Builds, Spreads Colloquium Concepts”, CBS Alumni News, Fall 1996
- “Yalies Pitch In At Science Fair”, Yale Daily News, February 7, 2003
- “Fast Track to Teaching - States design high-speed routes for scientists to run classroom”, Howard Hughes Medical Institute Bulletin, March 2003, Vol 16 (1): 4-5.
- “Program Teams Yale Scientists, Middle School Students”, Yale Bulletin and Calendar, March 28, 2003, Volume 31, Number 23.
- “Dr. Ngô Passion For Teaching Science Is Contagious”, New Haven Register, April 10, 2003.
- “Sheridan Chosen as 1st NASA Explorer School in State” New Haven Register, June 12, 2003
- “The NASA Education Enterprise: Inspiring the Next Generation of Explorers”. National Aeronautics and Space Administration Website.
- “Dr. Ngo’s Students Say ‘Yes’ to Science”. Hartford Courant, October 4, 2003, page A1.
- “Ngô evolves from researcher to Elm City teacher”, Yale Daily News, December 4, 2003, p. A1z
- “Marsapalooza: An Out-of-This-World “Opportunity” to Inspire the Next Generation of Explorers.” National Aeronautics and Space Administration.
- “Local Students Visit EPH Labs” Yale University School of Public Health Website, March 2004.
- “Sheridan School Students Look Into Space Through Eyes of Astronaut”, New Haven Register, April 9, 2004, page A3
- “NASA’s a Blast at Sheridan”, Yale Daily News, April 4, 2004, page 5
- “More Visits to Goddard Explorer Schools; Education is the Key”. NASA Goddard News, April 2004, Vol. 1, Issue 4.
- “Sky is no longer the limit at NASA Explorer Schools”, Ocean to Orbit, Hamilton Sundstrand Quarterly Publication, January 2005
- “Sheridan-NASA call out of this world”, New Haven Register, April 1, 2005.