

Curriculum Vitae Natalie G. Ahn

ADDRESS: Department of Biochemistry
Jennie Smoly Caruthers Biotechnology Building
3415 Colorado Avenue, 596 UCB
University of Colorado at Boulder
Boulder, CO 80309-0596
Phone: (303) 492-4799 (Phone)
Email: natalie.ahn@colorado.edu

I. ACADEMICS

EDUCATION

Postdoctoral Fellow, 1988-1990, Department of Pharmacology, Univ. of Washington, Seattle
Research advisor: Edwin G. Krebs

Postdoctoral Fellow, 1985-1987, Department of Medicine, Univ of Washington, Seattle
Research advisor: Christoph de Haën

Ph.D., 1985, Department of Chemistry University of California, Berkeley
Thesis advisor: Judith P. Klinman

1979-1981 Teaching Assistant, undergraduate chemistry, Dept. of Chemistry

1981-1985 Research Assistant, Dept. of Chemistry

B.S., 1979, Department of Chemistry, University of Washington, Seattle
Undergraduate senior thesis advisor: Lyle H. Jensen, Department of Biological Structure
Undergraduate research advisor: David C. Teller, Department of Biochemistry

APPOINTMENTS

2018-present Distinguished Professor, University of Colorado

2003-present Associate Director, BioFrontiers Institute, Univ. Colorado, Boulder

1994-2014 Investigator, Howard Hughes Medical Institute (1994-2002 Assistant Investigator; 2003-2004 Associate Investigator; 2005-2014 Investigator)

1993-present Member, UCHSC Cancer Center, Univ. Colorado Health Sciences Center, Denver

1992-2018 Professor, Department of Chemistry and Biochemistry, Univ. Colorado, Boulder (1992-1998 Assistant Professor; 1998-2003 Associate Professor; 2003-present Professor)

1990-1992 Research Assistant Professor, Department of Biochemistry, Univ. Washington, Seattle

II. HONORS

2020	Fellow, American Society of Biochemistry and Molecular Biology
2018	Distinguished Professor, University of Colorado
2018	Member, National Academy of Sciences
2018	Member, American Academy of Arts and Sciences
2016-2018	President, American Society of Biochemistry and Molecular Biology
2012	Professor of Distinction, College of Arts & Sciences, U. Colorado, Boulder
2012-2014	President, U.S. Human Proteome Organization (US-HUPO)
2004	“Proteomics Pioneer”, ProteoMonitor
1997	Teaching Excellence Award, Mortar Board Society
1994-1995	Eli Lilly Biochemistry Academic Award
1993-1996	Searle Scholarship Award
1988-1991	Merck Fellowship Award
1985-1988	Individual National Research Service Award (Postdoctoral), NIH
1979	Phi Beta Kappa

III. SERVICE**NATIONAL & INTERNATIONAL SERVICE**

2022-present	Member, NIGMS Council
2019-2021	Awards Committee, American Association for Cancer Research
2018-2019	Past-president, American Society of Biochemistry and Molecular Biology
2016-2018	President, American Society of Biochemistry and Molecular Biology
2016-2020	National Institutes of Health Grant Review Panel (TCB, regular member)
2017	External Review Committee, Dept. Biochemistry & Molecular Biology, U. Massachusetts, Amherst
2015-2016	President-elect, American Society of Biochemistry and Molecular Biology
2015	National Institutes of Health Grant Review Panel (TCB, ad hoc)
2015	National Institutes of Health Grant Review Panel (ZRG1 F05, ad hoc)
2015	National Institutes of Health Grant Review Panel (TCB, ad hoc)
2015	National Institutes of Health CSR Pilot Study, Cell Biology
2014-2016	Past-president, U.S. Human Proteome Organization (US-HUPO)
2014	NCI Intramural Review Panel, Laboratory of Cell Developmental Signaling
2014	National Institutes of Health Grant Review Panel (F32, ZRG1_F05, ad hoc)
2012-2015	Voting Council Member, American Society of Biochemistry and Molecular Biology
2012-2014	President, U.S. Human Proteome Organization (US-HUPO)
2012	Grant Review Panel, U.S.-Israel Binational Science Foundation
2010-2011	President-Elect, U.S. Human Proteome Organization (US-HUPO)
2008	External Advisory Board, Moffitt Cancer Center NCDDG Grant
2007-2011	National Institutes of Health Grant Review Panel, Regular Member, BRT-B
2006	National Institutes of Health Grant Review Panel (K99, ad hoc)
2005	National Institutes of Health Grant Review Panel (Roadmap, ad hoc)
2004	External Advisory Board, Institute for Molecular Sciences, Richmond, CA

2004	External Review Committee, Van Andel Institute, Grand Rapids, MI
2003	National Institutes of Health Grant Review Panel (NCRP, ad hoc)
2002-2004	External Advisory Board, North Dakota Biomedical Research Infrastructure Network
1999-2003	National Institutes of Health Grant Review Panel, Regular Member, CDF3
1995-1996	National Institutes of Health Grant Review Panel (ad hoc)
1994-1995	National Science Foundation Grant Review Panel (ad hoc)
1994	US Army Breast Cancer Grant Review Panel

EDITORIAL BOARDS

2021-present	Editorial Board, <i>Proc. Natl. Acad. Sci. USA</i>
2001-present	Editorial Board, <i>Molecular and Cellular Proteomics</i>
2012-2015	Board of Editors, <i>Journal of Molecular Biology</i>
2010-2015	Editorial Board, <i>Cancer Research</i>
2009-2013	Editorial Advisory Board, <i>Journal of Proteome Research</i>
2000-2018	Editorial Advisory Board, <i>Biochemistry</i>
1998-2003	Editorial Board, <i>Journal of Biological Chemistry</i>

MEETING ORGANIZATION

2017	Co-chair, Annual Meeting of the American Society of Biochemistry and Molecular Biology
2010	Chair, 6 th Annual Meeting of the U.S.-Human Proteome Organization (US-HUPO)
2007	Session Organizer, Annual Meeting of the Association of Biomolecular Resource Facilities
2006	Chair, Gordon Research Conference in Phosphorylation and G protein Signaling Networks
2006	Session Organizer, Annual Meeting of the American Society of Mass Spectrometry
2006	Program Planning Committee, 100 th Annual Meeting of the ASBMB
2003	Session Organizer, Annual Meeting of the Association of Biomolecular Resource Facilities
2003	Program Planning Committee, Annual Meeting of the ASBMB
2002	Chair, Keystone Symposium on Phosphorylation and Cellular Regulation

FACULTY/STUDENT VISITORS (HOST FOR SABBATICALS, RESEARCH PROJECTS)

Dr. Miwako Homma, Assoc. Prof., Dept. of Biomolecular Science, Fukushima Medical University, Fukushima Japan (July-Nov 2014)
Dr. Ho-jeong Kwon, Prof., Dept. of Biotechnology, Yonsei University, Seoul Korea (June 2012)
Dr. John Shabb, Assoc. Prof., Dept. of Biochemistry, Univ. North Dakota, Grand Forks, ND (July 2005-June 2006, November 2006, March 2007, June 2008)
Dr. Kee-hong Kim, Center for Prostate Cancer Research, Bethesda, MD (2 weeks in 2005)
Dr. Peter Wilden, Prof, Dept. Pharmacology, Univ. Missouri, Columbia (2 weeks in 2002)
Dr. Paul Laybourn, Assoc. Prof., Dept. Biochemistry, Colorado State Univ. (Nov 2002)
Ms. Olayinka Oyeyemi, Ph.D. Student, Lab of Judith Klinman, Dept. Chemistry, U. California, Berkeley (Oct-Nov 2002, July-Aug 2005, Jan-May 2006)
Dr. Liang Zhao, Postdoctoral Fellow, Lab of Judith Klinman, Dept. Chemistry, U. California, Berkeley (Oct-Nov 2002, Mar-May 2003)
Dr. Kun-Liang Guan, Prof., Dept of Biol. Sciences, Univ. of Michigan (Jan-June 2002)
Dr. Mark Winey, Assoc. Prof., Dept. of MCDB, Univ. Colorado Boulder, CO (Nov 1999-May 2000)
Dr. Craig Thulin, Asst. Prof., Dept. of Chemistry, Brigham Young Univ. (2-6 wks each in 2000, 2001, and 2002)

Dr. Robert Rice, Prof., Dept. of Toxicology, Univ. California, Davis, CA (Oct-Nov 1999)
 Dr. Judith Jaehning, Prof. Dept. of Biochemistry and Molecular Biology, Univ. Colorado Health Sciences Center, Denver, CO (July-Oct 1999)
 Dr. Kwang Chul Kim, Assoc. Prof. Dept. of Pharmacy, Univ. Maryland, Baltimore MD (March-April 1998)

UNIVERSITY SERVICE

Institutional

2021 Faculty Post-tenure Review Committee
 2018-present Mentoring Committee for BioFrontiers junior faculty member
 2017-2018 Internal Review Committee, Dept. of Mechanical Engineering, U. Colorado Boulder
 2014-2017 Chair, Supercomputer Allocations Committee, BioFrontiers Institute
 2012-2013 Chair, Faculty Search Committee, BioFrontiers Institute
 2011 Member, Operations Planning Committee, Jennie Smoly Caruthers Biotechnology Building
 2010-2011 Member, Chemical Biology Faculty Search Committee, BioFrontiers Institute
 2009-present Faculty Supervisor, Central Analytical Core Facility (Mass Spectrometry and Proteomics)
 2008-present Co-Director, CO-Pilot Grant Program, Colorado Clinical and Translational Sciences Institute (CCTSI)
 2008-2009 Member, Computational Biology and Bioinformatics Faculty Search Committee, BioFrontiers Institute
 2007-2008 Chair, Computational Biology and Bioinformatics Faculty Search Committee, BioFrontiers Institute
 2007-2008 Member, Experimental Biophysics Faculty Search Committee, BioFrontiers Institute
 2007 Organizing Committee, 2007 Butcher Symposium
 2006-2007 Planning Committee, Program Plan for Systems Biotechnology Building
 2004-2005 Chair, Molecular Biotechnology Faculty Search Committee, BioFrontiers Institute
 2003-2004 Chair, Bioinformatics Faculty Search Committee, BioFrontiers Institute
 2003-2017 CU-Boulder liaison, Univ. Colorado Cancer Center
 2003-present Associate Director, BioFrontiers Institute
 2002-2005 President's Taskforce on Genomics and Biotechnology
 2001-present Steering Committee, Alliances for Graduate Education and the Professoriate (AGEP)
 1999-present Director, Graduate Training Program in Signaling and Cellular Regulation (T32)
 1997-2017 Steering Committee member, Medical Scientists Training Program (MD/PhD)
 1996-2001 Institutional Biosafety Committee (Chair 1998-2001)

Departmental

2021 Member, Graduate Orals Exam Committee
 2020 Search Committee for Director of Chemical Education
 2018-present Mentoring Committee for Biochemistry junior faculty member
 2017-2018 Chair, Subcommittee for junior faculty promotion
 2015-2016 Departmental Governance Subcommittee
 2014-2016 Biochemistry Division Oversight Subcommittee
 2012-2013 Chair, Subcommittee for senior faculty promotion
 2011 Departmental Budget Reconciliation Committee
 2010-2011 Chair, Subcommittee for senior faculty promotion

2010-2011	Member, Subcommittee for junior faculty promotion
2007-2008	Chair, Subcommittee for junior faculty promotion
2007-2008	Member, Subcommittee for junior faculty reappointment
2006-2007	Member, Organic Chemistry Faculty Search Committee
2005-2006	Faculty Retention Committee
2004-2006	Chair, Subcommittees for promotion of two junior faculty
2004-2005	Member, Subcommittee for promotion of one junior faculty
2002-2004	Carnegie Initiative for the Doctorate committee
2002-2003	Biochemistry Faculty Search Committee
2001-2003	Departmental Executive Committee
2000	Merit Evaluation Committee
1999-2000	Biochemistry Faculty Search Committee
1997-1999	Staff Retention Committee
1995-2000	Graduate Scholastic Committee
1995-2001	Tissue Culture Facility Supervisor
1995-1998	Graduate Advisor, Biochemistry Division
1994-1995	Diversity Committee
1994-1998	Cristol Building Renovations
1994-1995	Biochemistry Faculty Search Committee
1993-1994	Biochemistry Faculty Search Committee
1997-1998	Biochemistry Faculty Search Committee

IV. PATENTS

Seger, R., Seger, D., Ahn, N.G., and Krebs, E.G. Human signal transduction MAPK kinase. Issued on Sept. 2 1997 in the USA, US patent 5,663,314. Serial number: 423399; Intl. Class CO7H 021/04; US Class 536/023.2.

V. PUBLICATIONS

172. Kavran, A.J., Stuart, S.A., Hayashi, K.R., Basken, J.M., Brandhuber, B.J. and Ahn, N.G. (2022) Intermittent treatment of BRAF-V600E melanoma cells delays resistance by adaptive resensitization to drug rechallenge. *Proc. Natl. Acad. Sci. USA* in press.
171. Pegram, L.M., Anderson, J.W. and **Ahn, N.G.** (2021) Dynamic equilibria in protein kinases. *Curr. Op. Struct. Biol.* 71:215-222. PMID: 34425481.
170. Iverson, D.B., Xiao, Y., Jones, D.N, Eisenmesser, E.Z. and **Ahn N.G.** (2020) Activation loop dynamics are coupled to core motions in extracellular signal-regulated kinase-2. *Biochemistry* 59:2698-2706. PMID: 32643366.
169. Zhang, J., Balsbaugh, J.L, Gao, S., **Ahn, N.G.** and Klinman, J.P. (2020) Hydrogen deuterium exchange defines catalytically linked regions of protein flexibility in the catechol O-methyltransferase reaction. *Proc. Natl. Acad. Sci. USA* 117:10797-10805. PMID: 32371482.

168. Lopez, E.D., Burastero, O., Arcon, J.P., Defilipe, L/A., **Ahn, N.G.**, Marti, M.A. and Turjanski, A.G. (2020) Kinase activation by small conformational changes. *J. Chem. Inf. Model.* 60:821-832. PMID: 31714778.
167. Pegram, L.M., Liddle, J.C., Xiao, Y., Hoh, M., Rudolph, J., Iverson, D., Vigers, G.P., Smith, D., Zhang, H., Wang, W., Moffatt, J.G. and **Ahn, N.G.** (2019) Activation loop dynamics are controlled by conformation selective inhibitors of ERK2. *Proc. Natl. Acad. Sci. USA* 116:15463-15468. PMID: 31311868
166. Masson, G.R., Burke, J.E., **Ahn, N.G.**, et al. Recommendations for performing, interpreting and reporting hydrogen deuterium exchange mass spectrometry (HDX-MS) experiments. *Nat. Methods* 16:595-602. PMID: 31249422
165. Basken, J., Stuart, S.A., Kavran, A.J., Lee, T., Ebmeier, C.C., Old, W.M. and **Ahn, N.G.** (2018) Specificity of phosphorylation responses to MAP kinase pathway inhibitors in melanoma cells. *Mol. Cell. Proteomics*, 17(4):550-564. PMID:29255136
164. Mattioli, F., Bhattacharyya, S., Dyer, P.N., White, A.E., Sandman, K., Burkhart, B.W., Byrne, K.R., Lee, T., **Ahn, N.G.**, Santangelo, T.J., Reeve, J.N. and Luger, K. (2017) Structure of histone based chromatin in Archaea. *Science*, 357(6351):609-661. PMID:28798133.
163. Connacher M.K., Tay, J.W. and Ahn, N.G. (2017) Rear-polarized Wnt5a-receptor-actin-myosin-polarity (WRAMP) structures promote the speed and persistence of directional cell migration. *Mol. Biol. Cell.* 28(14):1924-1936. PMID: 28592632.
162. Mattioli, F., Gu, Y., Balsbaugh, J.L, Ahn, N.G. and Luger, K. (2017) The Cac2 subunit is essential for productive histone binding and nucleosome assembly in CAF-1. *Sci. Rep.* 7:46274. PMID:28418026.
161. Mattioli F, Gu Y, Yadav T, Balsbaugh JL, Harris MR, Findlay ES, Liu Y, Radebaugh CA, Stargell LA, **Ahn NG**, Whitehouse I, Luger K. (2017) DNA-mediated association of two histone-bound CAF-1 complexes drives tetrasome assembly in the wake of DNA replication. *Elife.* 6:e22799. PMID:28315523.
160. Liu W.H., Roemer, S.C., Zhou, Y., Shen, Z.J., Dennehey, B.K., Balsbaugh, J.L, Liddle, J.C., Nemkov, T. Ahn, N.G., Hansen, K.C., Tyler, J.K. and Churchill, M.E. (2016) The Cac1 subunit of histone chaperon CAF-1 organizes CAF-1-H3/H4 architecture and tetramerizes histones. *Elife.* 5:e18023. PMID:27690308.
159. Goshen-Lago, T., Goldberg-Carp, A., Melamed, D., Darlyuk-Saadon, I., Bai, C., Ahn, N.G., Admon, A. and Engelberg, D. (2016) Variants of the yeast MAPK Mpk1 are fully functional independently of activation loop phosphorylation. *Mol. Biol. Cell.* 27(17):2771-2783. PMID:27413009.

158. Beenstock, j., Melamed, D., Mooshayef, N., Mordechay, D., Garfinkel, B.P., Ahn, N.G., Admon, A. and Engelberg, D. (2016) p38b mitogen activated protein kinase modulates its own basal activity by autophosphorylation of the activating residue Thr180 and the inhibitory residues Thr241 and Thr261. *Mol. Cell Biol.* 36(10):1540-1554. PMID:26976637.
157. Smorodinsky-Atias, K., Goshen-Lago, T., Goldberg-Carp, A., Melamed, D., Shir, A., Mooshayef, N., Beenstock, J., Karamansha, Y., Darlyuk-Saadon, I., Livnah, O., **Ahn, N.G.**, Admon, A. and Engelberg, D. (2016) Intrinsically active variants of Erk oncogenically transform cells and disclose unexpected autophosphorylation capability that is independent of TEY phosphorylation. *Mol Biol Cell.* 27(6):1026-39. PMID:26658610.
156. Singh, S.P., Schwartz, M.P., Tokuda, E.Y., Luo, Y., Rogers, R.E., Fujita, M., **Ahn, N.G.** and Anseth, K.S. (2015) A synthetic modular approach for modeling the role of the 3D microenvironment in tumor progression. *Sci Rep.:* 5:17814. PMID:26638791
155. Xiao, Y., Warner, L.R., Latham, M.P., **Ahn, N.G.** and Pardi, A. (2015) Structure-based assignment of Ile, Leu and Val methyl groups in the active and inactive forms of the mitogen-activated kinase extracellular signal-regulated kinase 2. *Biochemistry* 54:4307-4319. PMID: 26132046.
154. Volkov, V., Grissom, P., Arzhanik, V., Zaytsev, A., Renganathan, K., McClure-Begley, T., Old, W., **Ahn, N.**, and McIntosh, J.R. (2015) Centromere protein F includes two sites that couple efficiently in depolymerizing microtubules. *J. Cell Biol.* 209:813-828. PMID: 26101217.
153. Brown, R., Stuart, S., Houel, S., **Ahn, N.G.** and Old, W.M. (2015) Large-scale examination of factors influencing phosphopeptide neutral loss during collision induced dissociation. *J. Am. Soc. Mass Spectrom.* 26:1128-1142. PMID: 25851653.
152. Stuart, S.A., Houel, S., Lee, T., Wang, N., Old, W.M. and **Ahn, N.G.** (2015) A phosphoproteomic comparison of BRAF(V600E) and MKK1/2 inhibitors in melanoma cells. *Mol. Cell. Proteomics*, 14:1599-1615. PMID:25850435.
151. Lee, T., Wang, N., Houel, S., Coutts, K., Old, W., and **Ahn, N.** (2015) Dosage and temporal thresholds in miRNA proteomics. *Mol. Cell. Proteomics*, 14:289-302. PMID:25467838.
150. Xiao, Y., Liddle, J.C., Pardi, A. and **Ahn, N.G.** (2015) Dynamics of protein kinases: Insights from nuclear magnetic resonance. *Acc. Chem. Res.* 48:1106-1114. PMID:25803188
149. Long, J., Tokhunts, R., Old, W.M., Houel, S., Rodriguez-Blanco, J., Singh, S., Shilling, N., Capobianco, A.J., **Ahn, N.G.**, and Robbins, D.J. (2015) Identification of a family of fatty-acid-speciated sonic hedgehog proteins, whose members display differential biological properties. *Cell Reports*, 10:1280-1287. PMID:25732819.

148. Rudolph, J., Xiao, Y., Pardi, A. and **Ahn, N.G.** (2015) Slow inhibition and conformation selective properties of ERK1/2 inhibitors. *Biochemistry* 54(1):22-31. PMID:25350931.
147. Sours, K.M., Xiao, Y. and **Ahn, N.G.** (2014) Extracellular-regulated kinase 2 is activated by the enhancement of hinge flexibility. *J. Mol. Biol.*, 426:1925-1935. PMID: 24534729.
146. Xiao, Y., Lee, T., Latham, M.P., Warner, L.R., Tanimoto, A., Pardi, A. and **Ahn, N.G.** (2014) Phosphorylation releases constraints to domain motion in ERK2. *Proc. Natl. Acad. Sci. USA*, 111(7):2506-2511. PMID: 24550275.
145. Beenstock, J., Ben-Yehuda, S., Melamed, D., Admon, A., Livnah, O., **Ahn, N.G.** and Engelberg, D. (2014) The p38 β mitogen-activated protein kinase possesses an intrinsic autophosphorylation activity, generated by a short region composed of the α G helix and MAPK insert. *J. Biol. Chem.*, 289(34):23546-23556. PMID:25006254.
144. Tracy, C.M., Gray, A.J., Cuéllar, J., Shaw, T.S., Howlett, A.C., Taylor, R.M., Prince, J.T., **Ahn, N.G.**, Valpuesta, J.M. and Willardson, B.M. (2014) Programmed Cell Death Protein 5 Interacts with the Cytosolic Chaperonin Containing Tailless Complex Polypeptide 1 (CCT) to Regulate β -Tubulin Folding. *J. Biol.Chem.* 289(7):4490-4502. PMID:24375412
143. Schwartz, M.P., Rogers, R.E., Singh, S.P., Lee, J.Y., Loveland, S.G., Koepsel, J.T., Witze, E.S., Montanez-Sauri, S.I., Sung, K.E., Tokuda, E.Y., Sharma, Y., Everhart, L.M., Nguyen, E.H., Zaman, M.H., Beebe, D.J., **Ahn, N.G.**, Murphy, W.L. and Anseth, K.S. (2013) A quantitative comparison of human HT1080 fibrosarcoma cells and primary human dermal fibroblasts identifies a 3D migration mechanism with properties unique to the transformed phenotype. *PLoS One*. 8(12):e81689. PMID: 24349113.
142. Witze, E.S., Connacher, M.K., Houel, S., Schwartz, M.P., Morphew, M.K., Reid, L., Sacks, D.B., Anseth, K.S. and **Ahn, N.G.** (2013) Wnt5a directs polarized calcium gradients by recruiting cortical endoplasmic reticulum to the cell trailing edge. *Developmental Cell*, 26, 645-657. PMID: 24091015
141. Templeton, P.D., Litman, E.S., Metzner, S.I., **Ahn, N.G.*** and Sousa, M.C.* (2013) Structure of mediator of RhoA-dependent invasion (MRDI) explains its dual function as a metabolic enzyme and a mediator of cell invasion. *Biochemistry* 52(33):5675-5684. PMID: 23859498
=> * Corresponding authors
140. Ponicsan, S.L., Houel, S., Old, W.M., **Ahn, N.G.**, Goodrich, J.A. and Kugel, J.F. (2013) The Non-Coding B2 RNA Binds to the DNA Cleft and Active-Site Region of RNA Polymerase II. *J. Mol. Biol.*, 425(19):3625-3638. PMID:23416138.
139. Coutts, K.L., Anderson, E.M., Gross, M.M., Sullivan, K. and **Ahn, N.G.** (2012)

- Oncogenic B-Raf signaling in melanoma cells controls a network of microRNAs with combinatorial functions. *Oncogene*, 32(15):1959-1970. PMID:22751131.
138. Wang, D., Zhang, Z., O’Loughlin, E., Lee, T., Houel, S., O’Carroll, D., Tarakhovsky, A., **Ahn, N.G.** and Yi, R. (2012) Quantitative functions of Argonaute proteins in mammalian development. *Genes Dev.*, 26, 693-704. PMID:22474261.
137. Luo, Y., Ellis, L.Z., Dallaglio, K., Takeda, M., Robinson, W.A., Robinson, S., Lewis, K.D., McCarter, M.D., Gonzalez, R., Norris, D.A., Roop, D.R., **Ahn, N.G.** and Fujita, M. (2012) Side population cells from human melanoma tumors reveal diverse mechanisms of chemoresistance. *J. Invest. Dermatol.*, 132, 2440-2450. PMID:22622430.
136. Yen, C.Y., Houel, S., **Ahn, N.G.**, and Old, W.M. (2011) Spectrum-to-spectrum searching using a proteome-wide spectral library. *Mol. Cell. Proteomics*, 10, M111.007666. PMID:21532008.
135. Oyeyemi, O.A., Sours, K.M., Lee, T., Kohen, A., Resing, K.A., **Ahn, N.G.*** and Klinman, J.P.* (2011) Comparative hydrogen-deuterium exchange for a mesophilic vs thermophilic dihydrofolate reductase at 25 °C: Identification of a single active site region with enhanced flexibility in the mesophilic protein. *Biochemistry*, 50, 8251-8260. PMID:21859100.
=> * Corresponding authors
134. Meyer-Arendt, K., Old, W.M., Houel, S., Renganathan, K., Eichelberger, B., Resing, K.A. and **Ahn, N.G.** (2011) IsoformResolver: A peptide-centric algorithm for protein inference. *J Proteome Res.*, 10, 3060-3075. PMID:21599010.
133. Sours, K.M. and **Ahn, N.G.** (2010) Analysis of MAP kinases by hydrogen exchange mass spectrometry. In “MAP Kinase Signaling Protocols”, R. Seger, Ed., *Methods in Molecular Biology*, 661, 239-255.
132. Ring, A.Y., Sours, K.M., Lee, T. and **Ahn, N.G.** (2010) Distinct patterns of activation-dependent changes in conformational mobility between ERK1 and ERK2. *Intl. J. Mass Spectrometry*, 302, 101-109. PMID:21599010.
131. Houel, S., Abernathy, R., Renganathan, K., Meyer-Arendt, K., **Ahn, N.G.** and Old, W.M. (2010) Quantifying the impact of chimera MS/MS spectra on peptide identification in large scale proteomics studies. *J. Proteome Res.*, 9, 4152-4160. PMID:20578722.
130. Oyeyemi, O., Sours, K.M., Lee, T., Resing, K.A., **Ahn, N.G.*** and Klinman, J.P.* (2010) Temperature dependence of protein motions in a thermophilic dihydrofolate reductase and its relationship to catalytic efficiency. *Proc. Natl. Acad. Sci., USA*, 107, 10074-10079. PMID:20534574.
=> * Corresponding authors
129. Prince, J.T. and **Ahn, N.G.** (2010) The case of the disappearing drug target. *Molecular Cell*, 37, 455-456.

128. **Ahn, N.G.** (2009) PORE-ing over ERK substrates. *Nat. Struct. Mol. Biol.*, 16, 1004-1005.
127. Kabuyama, Y., Litman, E.S., Templeton, P., Metzner, S.I., Witze, E.S., Argast, G.M., Langer, S.J., Polvinen, K., Shellman, Y., Chan, D., Shabb, J.B., Fitzpatrick, J.E., Resing, K.A., Sousa, M.C. and **Ahn, N.G.** (2009) A mediator of Rho-dependent signaling in melanoma moonlights as a methionine salvage enzyme. *Mol. Cell. Proteomics*, 8, 2308-2320. PMID:19620624.
Highlighted by this journal as an “Author’s Choice” article.
126. Argast, G.M., Croy, C.H., Coutts, K.L., Zhang, Z., Litman, E.S., Chan, D.C. and **Ahn, N.G.** (2009) Cross-regulation of plexin B1 by B-Raf signaling in melanoma cells. *Oncogene*, 28, 2697-2709. PMID:19483722.
125. Old, W.M., Shabb, J.S., Houel, S., Wang, H., Coutts, K.H., Yen, C-Y., Litman, E.S., Croy, C.H, Meyer-Arendt, K., Miranda, J.G., Brown, R.A., Witze, E.S., Schweppe, R.E., Resing, K.A. and **Ahn, N.G.** (2009) Functional proteomics identifies targets of phosphorylation by B-Raf signaling in melanoma. *Molecular Cell*, 34, 115-131. PMID:19362540.

Highlighted as a Molecular Cell Preview (Pawson T. and Taylor L. (2009) Protein phosphorylation goes negative. *Molecular Cell*. 34:139-140) and as a Nature News & Views article (Huang, P.H. and Marais R. (2009) Melanoma troops massed. *Nature* 459, 336-337).
124. Yen, C.-Y., Meyer-Arendt, K., Eichelberger, B., Houel, S., Old, W.M., Knight, R.D., **Ahn, N.G.**, Hunter, L.E. and Resing, K.A. (2008) A theoretical MS/MS library for spectrum-to-spectrum searching in large-scale identification of proteins. *Mol. Cell. Proteomics*, 8, 857-869. PMID:19106086.
123. Gehrke, A.S., Sun, S., Kurgan, L., **Ahn, N.**, Resing, K., Kafadar, K. and Cios, K. (2008) Improved machine learning method for analysis of gas phase chemistry of peptides. *BMC Bioinformatics*, 9, 515-529.
122. Levin-Salomon, V., Kogan, K., **Ahn, N.G.**, Livnah, O. and Engelberg, D. (2008). Isolation of intrinsically active (MEK- independent) variants of the ERK family of MAP kinases. *J. Biol. Chem.*, 283, 34500-34510. PMID:18829462.
121. Sours, K.M., Kwok, S.C., Rachidi, T., Lee, T., Ring, A., Hoofnagle, A.N., Resing, K.A. and **Ahn, N.G.** (2008) Hydrogen exchange mass spectrometry reveals activation-induced changes in conformational mobility of p38 α MAP kinase. *J. Mol. Biol.*, 379, 1075-1093. PMID:18501927.
120. Witze, E.S., Litman, E.S., Argast, G.M., Moon, R.T. and **Ahn, N.G.** (2008) Wnt5A control of cell polarity and directional movement by polarized redistribution of adhesion receptors. *Science*, 320, 365-369. PMID:18420933.

- Highlighted in Science Perspectives (Bowerman, B. (2008) Wnt moves beyond the canon. *Science*. 320, 327-328), by Science STKE (Ray, L.B. (2008) Editors' Choice: Cell biology cellular orienteering. *Science Signaling* 16, ec147), and as a Research Highlight in Nature Reviews (Kritikow E. (2008) Cell signalling: Dynamic redistribution. *Nat.Rev. Mol. Cell Biol.*, 9, 423).
119. Ahn, N.G. and Wang, A.H. (2008) Proteomics and genomics: perspectives on drug and target discovery. *Curr. Opin. Chem. Biol.*, 12, 1-3.
 118. Mattison, C.P., Old, W.M., Steiner, E., Huneycutt, B.J., Resing, K.A., **Ahn, N.G.** and Winey, M. (2007) Mps1 activation loop autophosphorylation enhances kinase activity. *J. Biol. Chem.*, 282, 30553-30561.
 117. Witze, E.S., Old, W.M., Resing, K.A. and **Ahn, N.G.** (2007) Mapping protein post-translational modifications with mass spectrometry. *Nat. Methods*, 4, 798-806.
 116. **Ahn, N.G.**, Shabb J.S., Old, W.M. and Resing, K.A. (2007) Achieving in-depth proteomics profiling by mass spectrometry. *ACS Chemical Biology*, 2, 39-52.
 115. Sun, S., Meyer-Arendt, K., Eichelberger, B., Brown, R., Yen, C.Y., Old, W.M., Pierce, K., Cios, K., **Ahn, N.G.** and Resing, K.A. (2007) Improved validation of peptide MS/MS assignments using spectral intensity prediction and full annotation of fragment ions. *Mol. Cell. Proteomics*, 6, 1-17.
 114. Shi, Z., Resing, K.A. and **Ahn, N.G.** (2006) Networks for the allosteric control of protein kinases. *Curr. Op. Struct. Biol.*, 16, 686-692.
 113. Emrick, M.A., Lee, T., Starkey, P., Mumby, M.C., Resing, K.A. and **Ahn, N.G.** (2006) The gatekeeper residue in ERK2 controls autoactivation *via* a pathway of intramolecular connectivity. *Proc. Natl. Acad. Sci. USA*, 103, 18101-18106.
 112. Schweppe, R.E., Cheung, T.H., and **Ahn, N.G.** (2006) Global gene expression analysis of ERK5 and ERK1/2 signaling reveals a role for HIF-1 in ERK5-mediated responses. *J. Biol. Chem.*, 281, 20993-21003.
 111. Roberts E.C., Hammond, K., Yin, H., Traish, A.M., Resing, K.A. and **Ahn, N.G.** (2006) Identification of G2/M targets for the MAP kinase pathway by functional proteomics. *Proteomics*, 6, 4541-4553.
 110. Ma, Z., Isumi, H., Kanai, M., Kabuyama, Y., **Ahn, N.G.** and Fukasawa, K. (2006) Mortalin controls centrosome duplication via modulating centrosomal localization of p53. *Oncogene*, 25, 5377-5390.
 109. Kabuyama, Y., Langer, S.J., Polvinen, K., Homma, Y., Resing, K.A. and **Ahn, N.G.** (2006) Functional proteomics identifies protein tyrosine phosphatase 1B as a target of RhoA signaling. *Mol. Cell. Proteomics*, 5, 1359-1367.

108. Lee, T., Croy, C.H., Resing, K.A. and **Ahn, N.G.** (2006) Hydrogen exchange measurements in proteins. In "Handbook of Hydrogen Transfer" (Schowen, R.L., Klinman, J.P., eds), Wiley VHC, October 2006, Chapter 14, pp. 1361-1392.
107. Ruth, M.C., Old, W.M., Emrick, M.A., Meyer-Arendt, K., Aveline-Wolf, L.D., Pierce, K.G., Mendoza, A.M., Sevinsky, J.R., Hamady, M., Knight, R.D., Resing, K.A. and **Ahn, N.G.** (2006) Analysis of membrane proteins from human chronic myelogenous leukemia cells: Comparison of extraction methods for multidimensional LC-MS/MS. *J. Proteome Res.*, 5, 709-719.
106. Ruth, M.C., Xu, Y., Maxwell, I.H., **Ahn, N.G.**, Norris, D.A. and Shellman, Y.G. (2006) RhoC promotes human melanoma invasion in a PI3K/Akt-dependent pathway. *J. Invest. Dermatol.*, 126, 862-868.
105. Yen, C.Y., Russell, S., Mendoza, A.M., Meyer-Arendt, K., Sun, S.J., Cios, K.J., **Ahn, N.G.** and Resing, K.A. (2006) Improving sensitivity in shotgun proteomics using a peptide-centric database with reduced complexity: Protease cleavage and SCX elution rules from data mining of MS/MS spectra. *Anal. Chem.*, 78, 1071-1084.
104. Lee, T., Hoofnagle, A.N., Resing, K.A., and **Ahn, N.G.** (2006) Protein hydrogen exchange measured by electrospray ionization mass spectrometry. in "Cell Biology: A Laboratory Handbook", Third Edition, J.E. Celis, Ed., Elsevier Science. v. 4, 443-449.
103. Downer, J., Sevinsky, J., **Ahn, N.**, Resing, K. and Betterton, M.D. (2005). Incorporating expression data in metabolic modeling: a case study of lactate dehydrogenase, *J. Theoretical Biol.*, 240, 464-474.
102. Resing, K.A. and **Ahn, N.G.** (2005) Proteomics of melanoma cell lines and cultured melanocytes. In "Melanocytes to Melanoma: The Progression to Malignancy" (Hearing, V.J. and Leong, S.P.L., eds), Humana Press, Totowa, New Jersey. pp. 408-426.
101. Lee, T., Hoofnagle, A.N, Resing, K.A. and **Ahn, N.G.** (2005) Hydrogen exchange solvent protection by an ATP analogue reveals conformational changes in ERK2 upon activation. *J. Mol. Biol.*, 353, 600-612.
100. Old, W.M., Meyer-Arendt, K., Aveline-Wolf, K., Pierce, K.G., Mendoza, A., Sevinsky, J.R., Resing, K.A. and **Ahn, N.G.** (2005) Comparison of label-free methods for quantifying human proteins by shotgun proteomics. *Mol. Cell. Proteomics*, 4, 1487-1502.
99. **Ahn, N.G.** and Resing, K.A. (2005) Lessons in rational drug design for protein kinases. *Science*, 308, 1266-1267.
98. Resing, K.A. and **Ahn, N.G.** (2005) Proteomics strategies for protein identification. *FEBS Lett.*, 579, 885-889.

97. Resing, K.A. and **Ahn, N.G.** (2004) Identification of proteins by in-gel digestion and mass spectrometry. in "Proteome Analysis: Interpreting the Genome" D.W. Speicher, Ed., Elsevier Science, Inc., pp. 163-182.
96. Kabuyama, Y., Resing, K.A. and **Ahn, N.G.** (2004) Applying proteomics to signaling networks. *Curr. Op. Genetics and Dev.*, 14, 492-498.
95. Liang, Z.X., Tsigos, I., Lee, T., Bouriotis, V., Resing, K.A., **Ahn, N.G.** and Klinman J.P. (2004) Evidence for increased local flexibility in psychrophilic alcohol dehydrogenase relative to its thermophilic homologue. *Biochemistry*, 43, 14676-14683.
94. Jaspersen, S. L., Huneycutt, B. J., Giddings, Jr., T. H., Resing, K. A., **Ahn, N. G.** and Winey M. (2004) Cdc28/Cdk1 regulates spindle pole body duplication through phosphorylation of Spc42 and Mps1. *Developmental Cell*, 7, 263-274.
93. Resing, K.A., Meyer-Arendt, K., Mendoza, A.M., Aveline-Wolf, L.D., Jonscher, K.R., Pierce, K.G., Old, W.M., Cheung, H.T., Russell, S., Wattawa, J.L., Goehle, G.R., Knight, R.D. and **Ahn, N.G.** (2004) Improving reproducibility and sensitivity in identifying human proteins by shotgun proteomics. *Anal. Chem.*, 76, 3556-3568.
92. Liang, Z.-X., Lee, T., Resing, K.A., **Ahn, N.G.** and Klinman, J.P. (2004) Thermal-activated protein mobility and its correlation with catalysis in thermophilic alcohol dehydrogenase. *Proc. Natl. Acad. Sci. USA*, 101, 9556-9561.
91. Kabuyama, Y., Polvinen, K., Resing, K.A. and **Ahn, N.G.** (2004) Two-dimensional electrophoresis for the identification of signaling targets. in "Signal Transduction Protocols", R.C. Dickson, M. D. Mendenhall, Eds. *Methods Mol. Biol.* 284, 37-49.
90. Lee, T., Hoofnagle A. N., Kabuyama, Y., Stroud, J., Min, X., Goldsmith, E.J., Chen, L., Resing, K.A. and **Ahn, N.G.** (2004) Docking site interactions in MAP kinases revealed by hydrogen exchange mass spectrometry. *Molecular Cell*, 14, 43-55.
89. Sevinsky J.R., Whalen, A.M. and **Ahn, N.G.** (2004) ERK induces the megakaryocyte gene GPIIb/CD41 through MafB/Kreisler. *Mol. Cell. Biol.*, 24, 4534-4545.
88. Hoofnagle A. N., Resing, K. A. and **Ahn, N.G.** (2004) Practical methods for deuterium exchange/mass spectrometry. in "MAP kinase protocols", R. Seger, Ed., *Methods Mol. Biol.*, 250, 283-298.
87. Bernard, K.R., Jonscher, K.R., Resing, K.A. and **Ahn, N.G.** (2004) Methods in functional proteomics: 2D-PAGE with immobilized pH gradients (IPG), in gel digestion, and identification of proteins by mass spectrometry. in "MAP kinase protocols", R. Seger, Ed., *Methods Mol. Biol.* 250, 263-282.

86. Hoofnagle A. N., Stoner, J.W., Lee, T., Eaton, S.S. and **Ahn, N.G.** (2004) Phosphorylation-dependent changes in structure and dynamics in ERK2 detected by site directed spin labelling and electron paramagnetic resonance. *Biophys. J.*, 86, 395-403.
85. Haydon, C.E., Eysers, P.A., Wolf, L.A., Resing, K.A., Maller, J.L. and **Ahn, N.G.** (2003) Identification of novel phosphorylation sites on *Xenopus laevis* Aurora A and analysis of phosphopeptide enrichment by IMAC. *Mol. Cell. Proteomics*, 2, 1055-1067.
84. Bernard, K., Litman, E., Fitzpatrick, J., Shellman, Y., Argast, G., Polvinen, K., Everett, A., Fukasawa, K., Norris, D., **Ahn, N.G.** and Resing, K.A. (2003) Functional proteomic analysis of melanoma progression. *Cancer Res.*, 63, 6716-6725.
83. Schweppe, R.E., Melton A.A., Brodsky, K.S., Aveline, L.D., Resing, K.A., **Ahn, N.G.** and Gutierrez-Hartmann, A. (2003) Purification and mass spectrometric identification of GABP as the functional pituitary Ets factor binding to the basal transcription element of the prolactin promoter. *J. Biol. Chem.*, 278, 16863-16872.
82. Schweppe R.E., Resing, K. A. and **Ahn, N.G.** (2003) The characterization of post-translational modifications by mass spectrometry. *Accounts Chem. Res.*, 36, 453-61.
81. Galasinski S.G., Resing, K.A. and **Ahn, N.G.** (2003) Histone modifications. *Methods*, 31, 3-11.
80. Hoofnagle A. N., Resing, K.A. and **Ahn, N.G.** (2003) Protein analysis by hydrogen exchange mass spectrometry. *Ann. Rev. Biophys. Biomol. Struct.*, 32, 1-25.
79. Aurandt, J., Vikis, H.G., Gutkind, J.S., **Ahn, N.** and Guan, K.L. (2002) The semaphorin receptor plexin B1 signals through a direct interaction with the Rho specific nucleotide exchanger, LARG. *Proc. Natl. Acad. Sci. USA*, 99, 12085-12090.
78. Roberts, E.C., Shapiro, P.S., Nahreini, T.S., Pages, G., Pouyssegur, J. and **Ahn, N.G.** (2002) Distinct cell cycle timing requirements for ERK and PI3K signaling pathways in somatic cell mitosis. *Mol. Cell. Biol.*, 22, 7226-7241.
77. Vaish, N.K., Dong, F., Andrews, L., Schweppe, R.E., **Ahn, N.G.**, Blatt, L. and Seiwert, S.D. (2002) Monitoring post-translational modification of proteins in solution with allosteric ribozymes. *Nature Biotechnology*, 20, 810-815.
76. McLaughlin, J.N., Thulin, C.D., Hart, S.J., Resing, K.A., **Ahn, N.G.** and Willardson, B.M. (2002) Regulatory interaction of phospho-ucin-like protein with the cytosolic chaperonin complex. *Proc. Natl. Acad. Sci. USA*, 99, 7962-7967.
75. Galasinski, S.C., Resing, K.A., Goodrich, J.A. and **Ahn, N.G.** (2002) Phosphatase inhibition leads to histone deacetylase 1/2 phosphorylation and disruption of co-repressor interactions. *J. Biol. Chem.*, 277, 19618-19626.

74. Galasinski S., Louie D.F., Gloor, K.K., Resing, K.A. and **Ahn, N.G.** (2002) Global regulation of post-translational modifications on core histones. *J. Biol. Chem.*, 277, 2579-2588.
73. Sharma, P., Veeranna, Sharma, M., Amin, N.D., Sihag, R.K., Grant, P., **Ahn, N.**, Kulkarni, A.B. and Pant, H.C. (2002) Phosphorylation of MEK1 by cdk5/p35 down-regulates the mitogen-activated protein kinase pathway. *J. Biol. Chem.*, 277, 528-534.
72. **Ahn, N.G.** (2002) MAP kinase. Encyclopedic Reference of Cancer, M. Schwab (Editor), Springer-Verlag, Heidelberg.
71. **Ahn, N.G.** (2001) Introduction: protein phosphorylation and signaling. *Chem Rev.* 101, 2207-8 (N. Ahn, Editor).
70. Emrick, M.A., Hoofnagle, A.N., Miller, A.S., Ten Eyck, L.F. and **Ahn, N.G.** (2001) Constitutive activation of extracellular signal-regulated kinase 2 by synergistic point mutations. *J. Biol. Chem.*, 276, 46469-46479.
69. Thulin, C.D., Savage, J.R., McLaughlin, J.N., Truscott, S.M., Old, W.M., **Ahn, N.G.**, Resing, K.A., Hamm, H.E., Bitensky, M.W. and Willardson, B.M. (2001) Modulation of the G-protein regulator phospho-ducin by Ca²⁺/calmodulin-dependent protein kinase II phosphorylation and 14-3-3 protein binding. *J. Biol. Chem.*, 276, 23805-23815.
68. Friedman, D.B., Kern, J.W., Huneycutt, B.J., Vinh D.B.N., Crawford, D.K., Steiner, E., Scheiltz, D., Yates, J., Resing, K.A., **Ahn, N.G.**, Winey, M. and Davis, T.N. (2001) Yeast Mps1p phosphorylates the spindle pole component Spc110p in the N-terminal domain. *J. Biol. Chem.*, 276, 17958-17967.
67. Jesch S.A., Lewis, T.S., **Ahn, N.G.** and Linstedt, A.D. (2001) Mitotic phosphorylation of Golgi reassembly stacking protein 55 by mitogen activated protein kinase ERK2. *Mol. Biol. Cell*, 12, 1811-1817.
66. **Ahn, N.G.**, Nahreini, T.S., Tolwinski, N.S. and Resing, K.A. (2001) Pharmacologic inhibitors of MKK1 and MKK2. *Methods Enzymology*, 332, 417-431.
65. **Ahn, N.G.** and Resing, K.A. (2001) Towards the phosphoproteome (News and Views). *Nature Biotechnology*, 19, 317-318.
64. Hoofnagle A.N., Resing, K.A., Goldsmith, E.J. and **Ahn, N.G.** (2001) Changes in protein conformational mobility upon activation of ERK2, as detected by hydrogen exchange. *Proc. Natl. Acad. Sci. USA*, 98, 956-961.
63. Lewis, T.S., Hunt, J., Aveline, L.D., Jonscher, K.R., Louie, D.F., Yeh, J., Nahreini T.S., Resing, K.A. and **Ahn, N.G.** (2000) Identification of novel MAP kinase pathway signaling targets by functional proteomics and mass spectrometry. *Molecular Cell*, 6, 1343-1354.

62. Seiwert, S., Nahreini, T.S., Aigner, S., **Ahn, N.G.** and Uhlenbeck O.C. (2000) RNA aptamers as pathway-specific MAP kinase inhibitors. *Chemistry and Biology*, 7, 833-843.
61. Prowse, C.N., Hagopian, J.C., Cobb, M.H., **Ahn, N.G.** and Lew J. (2000) Catalytic reaction pathway for the mitogen-activated protein kinase, ERK2. *Biochemistry*, 39, 6258-6266.
60. Rak, J., Mitsuhashi, Y., Sheehan, C., Tamir, A., Vilorio-Petit, A., Filmus, J., Mansour, S.J., **Ahn, N.G.** Kerbel, R.S. (2000) Oncogenes and tumor angiogenesis: differential modes of vascular endothelial growth factor up-regulation in *ras*-transformed epithelial cells and fibroblasts. *Cancer Res.*, 60, 490-498.
59. Louie, D.F., Gloor, K.K., Galasinski, S.C., Resing, K.A. and **Ahn, N.G.** (2000) Phosphorylation and subcellular redistribution of high mobility group proteins 14 and 17, analyzed by mass spectrometry. *Protein Sci.*, 9, 170-179.
58. Holmström, T.H., Johnson, V.L., Tran, S., **Ahn, N.G.**, Chow, S.C. and Eriksson, J.E. (1999) Inhibition of mitogen-activated kinase signaling sensitizes tumor cells to Fas receptor-mediated apoptosis. *Mol. Cell. Biol.*, 19, 5991-6002.
57. Boeshans, K.M., Resing, K.A., Hunt, J.B., **Ahn, N.G.** and Shabb, J.B. (1999) Structural characterization of the membrane-associated regulatory subunit of type I cAMP dependent protein kinase by mass spectrometry: Identification of Ser81 as the in vivo phosphorylation site of RI α . *Protein Sci.*, 8, 1515-1522.
56. Forsberg, E.C., Zaboikina, T.N, Versaw, W.K., **Ahn, N.G.** and Bresnick, E.H. (1999) Enhancement of β -Globin locus control region-mediated transactivation by mitogen-activated protein kinases through stochastic and graded mechanisms. *Mol. Cell. Biol.*, 19, 5565-5575.
55. Resing, K.A., Hoofnagle, A.N. and **Ahn, N.G.** (1999) Modeling deuterium exchange behavior of ERK2 using pepsin mapping to probe secondary structure. *J. Am. Soc. Mass Spec.*, 10, 685-702.
54. Shapiro, P.S., Whalen, A.M., Tolwinski, N.S., Froelich-Ammon, S.J., Garcia, M., Osheroff, N. and **Ahn, N.G.** (1999) ERK activates topoisomerase II α through a mechanism independent of phosphorylation. *Mol. Cell. Biol.*, 19, 3551-3560.
53. **Ahn, N.G.**, Tolwinski, N.S., Hsiao, K. and Goueli, S.A. (1999) U0126: An inhibitor of MKK/ERK signal transduction in mammalian cells. *Promega Notes*, 71, 4-7.
52. Tolwinski, N.S., Shapiro, P.S., Goueli, S. and **Ahn, N.G.** (1999) Nuclear localization of MAP kinase kinase-1 is promoted by serum stimulation and G2/M progression. Requirement for phosphorylation at the activation lip and signaling downstream of MKK. *J. Biol. Chem.*, 274, 6168-6174.
51. Resing, K.A. and **Ahn, N.G.** (1999) Applications of mass spectrometry to signal transduction. *Prog. Biophys. Mol. Biol.*, 71, 501-523.

50. Shapiro, P.S., Vaisberg, E., Hunt, A.J., Tolwinski, N.S., Whalen, A.M., McIntosh, J.R. and **Ahn, N.G.** (1998) Activation of the MKK/ERK pathway during somatic cell mitosis. Direct interactions of active ERK with kinetochores and regulation of the mitotic 3F3/2 phosphoantigen. *J. Cell Biol.*, 142, 1533-1545.
49. Biggs, J.R., **Ahn, N.G.** and Kraft, A.S. (1998) Activation of the mitogen-activated protein kinase pathway in U937 leukemic cells induces phosphorylation of the amino terminus of the TATA binding protein. *Cell Growth Diff.*, 9, 667-676.
48. Duesbery, N.S., Webb, C., Leppla, S., Gordon, V.M., Klimpel, K.R., Copeland, T.D., **Ahn, N.G.**, Oskarsson, M.K., Fukasawa, K., Paull, K.D. and Vande Woude, G.F. (1998) Proteolytic inactivation of MAPKK by anthrax lethal factor. *Science*, 280, 734-737.
47. Veeranna, Amin, N.D, **Ahn, N.G.**, Jaffe, H., Winters, C.A., Grant, P., and Pant, H.C. (1998) Phosphorylation of Lys-Ser-Pro (KSP) repeats in high molecular weight neurofilament protein. *J. Neuroscience*. 18, 4008-4021.
46. Lewis, T.S., Shapiro, P.S. and **Ahn, N.G.** (1998) Signal transduction through MAP kinase cascades. *Adv. Cancer Res.*, 74, 49-139.
45. Shapiro, P.S. and **Ahn, N.G.** (1998) Feedback regulation of Raf-1 and mitogen activated protein kinase kinases 1 and 2 by MKP-1 phosphatase. *J. Biol. Chem.*, 273, 1788-1793.
44. Resing, K.A. and **Ahn, N.G.** (1998) Deuterium exchange mass spectrometry as a probe of protein kinase activation. Analysis of wild type and constitutively active mutants of MAP kinase kinase 1. *Biochemistry*, 37, 463-475.
43. Frost, J.A., Steen, H., Shapiro, P., Lewis, T., **Ahn, N.**, Shaw, P.E. and Cobb, M.H. (1997) Cross-cascade activation of ERKs and ternary complex factors by Rho family proteins.. *EMBO J.*, 16, 6426-6438.
42. Font de Mora, J., Porras, A., **Ahn, N.** and Santos, E. (1997) Mitogen-activated protein kinase is not necessary for, but antagonizes, 3T3-L1 adipocytic differentiation. *Mol. Cell. Biol.*, 17, 6068-6075.
41. Resing, K.A. and **Ahn, N.G.** (1997) Protein phosphorylation analysis by electrospray ionization mass spectrometry. *Methods Enzymology*, 283, 29-44.
40. Whalen, S.G., Marcellus, R.C., Whalen, A.M., **Ahn, N.G.**, Ricciardi, R.P. and Branton, P.E. (1997) Phosphorylation within the transactivation domain of adenovirus E1A protein by MAP kinase regulates expression of early region 4. *J. Virology*, 71, 3545-3553.
39. Whalen, A.M., Galasinski, S.C., Shapiro, P.S., Nahreini, T.S. and **Ahn, N.G.** (1997) Megakaryocytic differentiation induced by constitutive activation of MAP kinase kinase. *Mol. Cell. Biol.*, 17, 1947-1958.

38. Robinson, M.J., Cheng, M., Khokhlatchev, A., Ebert, D., **Ahn, N.**, Guan, K.-L., Stein, B., Goldsmith, E. and Cobb, M.H. (1996) Contribution of the MAP kinase phosphorylation lip to MEK specificity. *J. Biol. Chem.*, 271, 29734-29739.
37. Mansour, S.J., Candia, J.M., Matsuura, J., Manning, M. and **Ahn, N.G.** (1996) Interdependent domains controlling the enzymatic activity of MAP kinase kinase 1. *Biochemistry*, 35, 15529-15536.
36. Louie, D.F., Resing, K.A., Lewis, T.S. and **Ahn, N.G.** (1996) Mass spectrometric analysis of 40S ribosomal proteins from Rat-1 fibroblasts. *J. Biol. Chem.*, 271, 28189-28198.
35. Matten, W.T., Mansour, S.J., Copeland, T., **Ahn, N.G.** and Vande Woude, G.F. (1996) A positive feedback signal from MAPK to Mos during *Xenopus* oocyte maturation. *Dev. Biol.*, 179, 485-492.
34. Voyno-Yasenetskaya, T.A., Faure, M.P., **Ahn, N.G.**, and Bourne, H.R. (1996) $G_{\alpha 12}$ and $G_{\alpha 13}$ regulate extracellular signal-regulated kinase and c-Jun kinase pathways by different mechanisms in COS-7 cells. *J. Biol. Chem.*, 271, 21081-21087.
33. Choi, T., Rulong, S., Resau, J., Fukasawa, K., Matten, W., Kuriyama, R., Mansour, S., **Ahn, N.** and Vande Woude, G.F. (1996) Mos/MAP kinase can induce early meiotic phenotypes in the absence of MPF: A novel system for analyzing spindle formation during meiosis I, *Proc. Natl. Acad. Sci. USA*, 93, 4730-4735.
32. Mansour, S.J., Candia, J.M., Gloor, K. and **Ahn, N.G.** (1996) Constitutively activated MAPKK1 and MAPKK2 mediate similar transcriptional and morphological responses. *Cell Growth Diff.*, 7, 243-250.
31. Bokemeyer, D., Sorokin, A., Yan, M., **Ahn, N.G.**, Templeton, D.J. and Dunn, M.J. (1996) Induction of mitogen-activated protein kinase phosphatase 1 by the stress-activated protein kinase signaling pathway but not by extracellular signal-regulated kinase in fibroblasts. *J. Biol. Chem.*, 271, 639-642.
30. Chepenik, K.P., Shipman-Appasamy, P., **Ahn, N.** and Goldowitz, D. (1995) Developmental regulation of various annexins in the embryonic palate of the mouse: Dexamethasone affects expression of annexin-1. *J. Craniofacial Genetics Dev. Biol.*, 15, 171-181.
29. Thorburn, J., Carlson, M., Mansour, S.J., Chien, K.R., **Ahn, N.G.** and Thorburn, A. (1995) Inhibition of a signaling pathway in cardiac muscle cells by active MAP kinase kinase. *Mol. Biol. Cell*, 11, 1479-1490.
28. Markowitz, R.-B., Hermann, A.S., Taylor, D.F., He, L., Anthony-Cahill, S., **Ahn, N.G.** and Dynan, W.S. (1995) Phosphorylation of the C-terminal domain of RNA polymerase II by the extracellular-signal-regulated protein kinase, ERK2. *Biochem. Biophys Res. Comm.*, 207, 1051-1057.

27. Al-Alawi, N., Rose, D.W., Buckmaster, C., **Ahn, N.**, Rapp, U., Meinkoth, J. and Feramisco, J.R. (1995) TSH-induced mitogenesis is Ras dependent but appears to bypass the Raf-dependent cytoplasmic kinase cascade. *Mol. Cell Biol.*, 15, 1162-1168.
26. Resing, K.A., Mansour, S.J., Hermann, A.S., Johnson, R.S., Candia, J.M., Fukasawa, K., Vande Woude, G.F. and **Ahn, N.G.** (1995) Determination of v-Mos catalyzed phosphorylation sites and autophosphorylation sites on MAP kinase kinase by ESI/MS. *Biochemistry*, 34, 2610-2620.
25. Mansour, S.J., Matten, W.T., Hermann, A.S., Candia, J.M., Rong, S., Fukasawa, K., Vande Woude, G.F. and **Ahn, N.G.** (1994) Gain-of-function mutations in MAP kinase kinase promote mammalian cell transformation. *Science*, 265, 966-970.
24. Mansour, S.J., Resing, K.A., Candia, J.M., Hermann, A.S., Gloor, J.W., Herskind, K.R., Wartmann, M., Davis, R.J. and **Ahn, N.G.** (1994) Mitogen-activated protein kinase phosphorylation of mitogen-activated protein kinase-kinase: Analysis of *in vitro* phosphorylation sites. *J. Biochem.*, 116, 304-314.
23. Posada, J., Yew, N., **Ahn, N.G.**, Vande Woude, G.F. and Cooper, J.A. (1993) Mos stimulates MAP kinase in *Xenopus* oocytes and activates a MAP kinase kinase *in vitro*. *Mol. Cell Biol.*, 13, 2546-2553.
22. **Ahn, N.G.** (1993) The MAP kinase cascade. Discovery of a new signal transduction pathway. *Mol. Cell Biochem.*, 127/128, 201-209.
21. Genot, E.M., Meier, K.E., Liccardi, K.A., **Ahn, N.G.**, Uittenbogaart, C.H., Wietzerbin, J., Clark, E.A. and Valentine, M.A. (1993) Phosphorylation of CD20 in cells from a hairy cell leukemia cell line. Evidence for involvement of calcium/calmodulin-dependent protein kinase II. *J. Immunol.*, 151, 71-82.
20. Yonemura, K., Raines, E.W., **Ahn, N.G.** and Narayanan, A.S. (1993) Mitogenic signalling mechanisms of human cementum-derived growth factor. *J. Biol. Chem.*, 268, 26120-26126.
19. Krebs, E.G., **Ahn, N.G.**, Campbell, J.S., Graves, L.M., Seger, R. and Weiel, J.E. (1993) Regulation of protein serine/threonine kinases by tyrosine kinases. *Adv. Second Messengers Phosphoprotein Res.*, 28, 227-236.
18. Gause, K.C., Homma, M.K., Liccardi, K.A., Seger, R., **Ahn, N.G.**, Peterson, M.J., Krebs, E.G. and Meier, K.E. (1993) Effects of phorbol ester in mitogen-activated protein kinase activity in wild-type and phorbol ester-resistant EL4 thymoma cells. *J. Biol. Chem.*, 268, 16124-16129.
17. **Ahn, N.G.**, Campbell, J.S., Seger, R., Jensen, A.L., Graves, L.M. and Krebs, E.G. (1993) Metabolic labelling of mitogen-activated protein kinase kinase in A431 cells demonstrates phosphorylation on serine and threonine residues. *Proc. Natl. Acad. Sci. USA*, 90, 5143-5147.

16. **Ahn, N.G.**, Seger, R. and Krebs, E.G. (1992) The mitogen-activated protein kinase activator. *Curr. Op. Cell Biol.*, 4, 992-999.
15. Seger, R., Seger, D., Lozeman, F.J., **Ahn, N.G.**, Graves, L.M., Campbell, J.S., Ericsson, L., Harrylock, M., Jensen, A.M. and Krebs, E.G. (1992) Human T-cell mitogen-activated protein kinase kinases are related to yeast signal transduction kinases. *J. Biol. Chem.*, 267, 25628-25631.
14. Seger, R., **Ahn, N.G.**, Posada, J., Munar, E.S., Jensen, A.J., Cooper, J.A., Cobb, M.H. and Krebs, E.G. (1992) Purification and characterization of mitogen-activated protein kinase activator(s) from epidermal growth factor-stimulated A431 cells. *J. Biol Chem.*, 267, 14373-14381.
13. **Ahn, N.G.**, Robbins, D.J., Haycock, J.W., Seger, R., Cobb, M.H. and Krebs, E.G. (1992) Identification of an activator of the MAP kinases ERK1 and ERK2 in PC12 cells stimulated with nerve growth factor or bradykinin. *J. Neurochem.*, 59, 147-156.
12. Haycock, J.W., **Ahn, N.G.**, Cobb, M.H. and Krebs, E.G. (1992). ERK1 and ERK2, two microtubule-associated protein 2 kinases, mediate the phosphorylation of tyrosine hydroxylase at serine 31 *in situ*. *Proc. Natl. Acad. Sci. USA*, 89, 2365-2369.
11. Seger, R., **Ahn, N.G.**, Boulton, T.G., Yancopoulos, G.D., Panayotatos, N., Radziejewska, E., Ericsson, L., Bratlien, R.L., Cobb, M.H. and Krebs, E.G. (1991). Microtubule-associated protein 2 kinases, ERK1 and ERK2, undergo autophosphorylation on both tyrosine and threonine residues: Implications for their mechanism of activation. *Proc. Natl. Acad. Sci. USA*, 88, 6142-6146.
10. **Ahn, N.G.**, Seger, R., Bratlien, R.L. and Krebs, E.G. (1991). Growth factor stimulated phosphorylation cascades: Activation of growth factor-stimulated MAP kinase. *CIBA Foundation Symposia*, 164, 113-131.
9. **Ahn, N.G.**, Seger, R., Bratlien, R.L., Diltz, C.D., Tonks, N.K. and Krebs, E.G. (1991) Multiple components in an epidermal growth factor-stimulated protein kinase cascade. *In vitro* activation of a MBP/MAP2 kinase. *J. Biol. Chem.*, 256, 4220-4227.
8. **Ahn, N.G.** and Krebs, E.G. (1990) Evidence for an epidermal growth factor-stimulated protein serine/threonine kinase cascade in Swiss 3T3 cells. Activation of serine peptide kinase activity by myelin basic protein kinases *in vitro*. *J. Biol. Chem.*, 265, 11495-11501.
7. **Ahn, N.G.**, Weiel, J.E., Chan, C.P. and Krebs, E.G. (1990) Identification of multiple epidermal growth factor-stimulated protein serine/threonine kinases from Swiss 3T3 cells. *J. Biol. Chem.*, 265, 11487-11494.
6. Weiel, J.E., **Ahn, N.G.**, Seger, R. and Krebs, E.G. (1990) Communication between protein tyrosine and protein serine/threonine phosphorylation. *Adv. in Second Messengers and*

Protein Phosphorylation, Nishizuka, Y., Endo, M. and Tanaka, C., eds., Raven Press, New York, 24, pp. 182-195.

5. **Ahn, N.G.** and Klinman, J.P. (1989) Nature of rate-limiting steps in a compartmentalized enzyme system. Quantitation of dopamine transport and hydroxylation rates in resealed chromaffin granule ghosts. *J. Biol. Chem.*, 264, 12259-12265.
4. **Ahn, N.G.**, Teller, D.C., Bienkowski, M.J., McMullen, B.A., Lipkin, E.W. and de Haën, C. (1988) Sedimentation equilibrium analysis of five lipocortin-related phospholipase A₂ inhibitors from human placenta. *J. Biol. Chem.*, 263, 18657-18663.
3. **Ahn, N.** and Klinman, J.P. (1987) Activation of dopamine β -monoxygenase by external and internal electron donors in resealed chromaffin granule ghosts. *J. Biol. Chem.*, 262, 1485-1492.
2. **Ahn, N.G.**, Lipkin, E.W., Teller, D.C. and de Haën, C. (1986) Coupling between insulin binding and activation of glucose transport in rat adipocytes. *Fed. Proc.*, 45, 1835.
1. **Ahn, N.** and Klinman, J.P. (1983) Mechanism of modulation of dopamine β -monoxygenase by pH and fumarate as deduced from initial rate and primary deuterium isotope effect studies. *Biochemistry*, 22, 3096-3106.

VI. PRESENTATIONS

- 2021: FASEB Conference on The Understudied Druggable Proteome, Zoom Webinar
9th Annual Symposium on Structural Biology, University of Oklahoma, Norman, OK
Cori Lecture, Dept. of Biochemistry & Molecular Biophysics, Washington University, St Louis, MO
Dept. of Biochemistry, Biophysics & Molecular Biology, Iowa State Univ., Ames, IA
Dept. of Chemistry & Biochemistry, University of Windsor, Windsor, Ontario
Center for Structural Biology, National Cancer Institute, Frederick, MD
- 2020: Department of Chemistry and Biochemistry, Utah State University, Logan, UT
Department of Pharmacology, University of Texas Southwestern Medical School, Dallas, TX
- 2019: Advances in Mass Spectrometry Conference, U. Massachusetts, Amherst, MA
FASEB Conference on Protein Kinases, Rancho Mirage, CA
Edwin G. Krebs Memorial Lecture, Dept. of Pharmacology, Univ. Washington, Seattle, WA
Endocrine Research Conference, Univ. Colorado Anschutz Campus, Aurora, CO
Department of Chemistry and Chemical Biology, Northeastern University, Boston, MA
EMBL Conference on Post-translational Modifications, Heidelberg, Germany
Genentech, South San Francisco, CA

Department of Chemistry, University of California, Berkeley, CA
Department of Biological Science, Florida State University, Tallahassee, FL

- 2018: Israel Society of Biochemistry and Molecular Biology, Conference on Post-translational Modifications, Weizmann Institute, Rehovot, Israel
ASBMB Conference on Kinases and Pseudokinases, San Diego, CA
Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways, Waterville Valley, NH
Gordon Research Conference on Phosphorylation and G Protein Mediated Signaling Networks, Biddeford, ME
Leslie Hellerman Lecture, Department of Biological Chemistry, Johns Hopkins University School of Medicine, Baltimore, MD
- 2017: Keynote address: Asia Oceana Mass Spectrometry Conference, Singapore
Department of Biological Sciences, National University of Singapore
Hanson Lecture, Department of Biochemistry, Case Western Reserve University, Cleveland, OH
FASEB Conference on Protein Kinases and Phosphorylation, Cambridge, UK
Department of Biochemistry & Biophysics, Univ. of Pennsylvania, Philadelphia, PA
Department of Biochemistry, Georgia Tech University, Atlanta, GA
Vanderbilt Institute of Chemical Biology, Vanderbilt Univ., Nashville, TN
- 2016: Department of Biochemistry, Univ. Texas Medical Branch, Galveston, TX
Department of Molecular Biology, Princeton University, Princeton, NJ
- 2015: ASBMB Satellite Meeting on Pseudokinases, San Diego, CA
Maud Menten Seminar Series, Department of Biochemistry, University of Western Ontario, London, Ontario
Department of Chemistry, University of North Carolina, Chapel Hill, NC
Structural Biology 2015, CUNY Advanced Science Research Center, New York, NY
Wisconsin Human Proteomics Symposium, Univ. Wisconsin, Madison, WI
Gordon Conference, Hong Kong University of Science and Technology, Hong Kong
Distinguished Lecture, Fox Chase Cancer Center, Philadelphia, PA
Array BioPharma, Boulder, CO
- 2014 2nd Symposium of the Brazilian Proteomics Society and Pan-American Proteomics Society, Rio de Janeiro, Brazil
Structural Bioinformatics Group, CONICET, Univ. Buenos Aires, Argentina
Department of Pharmacological Sciences, Stony Brook Univ. Medical School, Stony Brook, NY
Department of Chemistry and Biochemistry, Univ. Arizona, Tucson, AZ
6th Copenhagen Bioscience Conference on “PTMs in Cell Signaling”, Novo Nordisk Fonden, Copenhagen, Denmark

- FEBS Advanced Lecture Course / 8th European Summer School on Advanced Proteomics, Kloster Neustift, Brixen, Italy
Gordon Conference on Protein Phosphorylation and G Protein Networks, Biddeford ME
Department of Cell Biology, University of Virginia, Charlottesville, VA
Center for Cancer Research, Purdue University, West Lafayette, CO
- 2013 Butcher Symposium, Westminster, CO
Developmental Therapeutics Retreat, Univ. Colorado Cancer Center, Denver CO
Annual Symposium of the American Society of Biochemistry and Molecular Biology, Boston, MA
21st Annual Conference, New England Bioscience Society, Boston MA
- 2012 Annual Meeting of the Biophysical Society, San Diego, CA
Plenary Speaker, Annual Meeting of the Korean Human Proteome Organization, Seoul, Korea
Center for Cell Signaling, Ewha University, Seoul, Korea
Dept. of Pharmacology, University of Texas Southwestern, Dallas, TX
FASEB Research Conference on Smooth Muscle, Snowmass Village, CO
W.M. Keck Foundation Meeting on Single Molecule Imaging, Los Angeles, CA
Plenary Speaker, Human Proteome Organization (HUPO) World Congress, Boston, MA
- 2011 ASMS Symposium on Peptide Fragmentation, Sanibel, FL
Keystone Symposium on The Evolution of Protein Phosphorylation, Keystone, CO
Origins of Cancer Symposium, Van Andel Research Institute, Grand Rapids, MI
Judith P. Klinman Symposium on Mechanistic Enzymology, Berkeley, CA
6th International Symposium on Enabling Technologies for Life Sciences, Boston, MA
- 2010 Lorne Conference on Protein Structure, Lorne, Australia
Edwin G. Krebs Memorial Symposium, Seattle, WA
Gordon Research Conference on Protein Phosphorylation and G Protein Networks, Biddeford ME
Keynote Talk, FASEB Summer Research Conference on Protein Phosphatases, Steamboat Springs, CO
5th Garvan Signaling Symposium, Sydney, Australia
Department of Biology, University of Northern Colorado, Greeley, CO
Department of Cell Biology, Stanford University, Palo Alto, CA
Department of Molecular Biology, Cell Biology and Biochemistry, Brown University, Providence, RI
Department of Cell Biology, University of Alberta, Edmonton, Alberta, Canada
- 2009 American Association for Cancer Research, Denver, CO
American Association for Experimental Biology, New Orleans, LA

VIII Annual Symposium of the European Protein Society, Zurich, Switzerland
EMBO Workshop on Wnt Signaling in Development and Disease, Arolla
Switzerland
2nd International Meeting on Signal Transduction, Mexican Biochemical
Society, Ixtapan de la Sal, Mexico
Department of Biochemistry, Abo Academi, Turku, Finland

2008 Annual Symposium of the American Society of Biochemistry and Molecular
Biology
Department of Biochemistry, Texas A&M University, College Station, TX
Gordon Research Conference on Phosphorylation and G-Protein Networks,
University of New England, ME
22nd Annual Symposium of the Protein Society, San Diego, CA
10th International Workshop on Scleroderma Research, Trinity College,
Cambridge, UK
Department of Chemistry, University of Cambridge, Cambridge, UK
International Congress of Cell Biology, Seoul, Korea
Department of Biochemistry, Colorado State University, Ft. Collins, CO
Wistar Institute, Philadelphia, PA

2007 AACR Special Conference “Advances in Proteomics in Cancer Research”
Amelia Island, FL
US HUPO Annual Meeting, Seattle, WA
“Proteomics 2007: Opening New Windows on Disease”, The Institute of
Medical Science, University of Tokyo, Tokyo, Japan
Institute of Molecular and Cellular Biosciences Department of Molecular
Biology, University of Tokyo, Tokyo, Japan
Department of Chemistry, University of Delaware
Department of Biochemistry, Wake Forest University
Cell Biology Program, The Scripps Research Institute, La Jolla, CA
Taketa Lecture, The Medical College of Wisconsin, Milwaukee, WI
Biophysics Seminar Series, Univ. of Colorado Health Sciences Center, Denver,
CO
Department of Pharmacology and Toxicology, Dartmouth Medical School,
Hanover, NH
Frontiers in Oncology Seminar, University of Maryland Greenebaum Cancer
Center, Baltimore, MD
FASEB Conference on Protein Kinases, Indian Wells, CA
Department of Molecular and Cellular Biology, University of Connecticut,
Storrs, CT
2007 International HUPO Symposium, Seoul, Korea
Basic Science Plenary Talk, 2007 Annual Meeting of the American Society of
Nephrology, San Francisco, CA
Annual Retreat Research Pre-Symposium, Institute of Molecular Biology,
Academia Sinica, Taiwan

- 2006
- Gallo Institute, San Francisco, CA
 - US HUPO Annual Meeting, Boston, MA
 - American Chemical Society 231st National Meeting, Atlanta, GA
 - 2006 ASBMB 100th Anniversary Symposium, San Francisco, CA
 - Earl W. Sutherland Symposium, Vanderbilt University, Nashville, TN
 - Department of Chemistry, Ohio State University, Columbus, OH
 - Annual Meeting of the American Society of Mass Spectrometry, Seattle, WA
 - Gordon Research Conference on Molecular and Cellular Biology, Tilton Academy, Tilton, New Hampshire
 - Frontiers in Melanoma Seminar Series, Univ. of Colorado Health Sciences Center, Denver, CO
 - Department of Biochemistry, Student Invited Seminar, Kansas State University, Manhattan, KS
 - Department of Biochemistry, Symposium Honoring David C. Teller, Univ. of Washington, Seattle, WA
 - Graduate Program in Cellular and Molecular Biology, Student Invited Seminar, University of Michigan, Ann Arbor, MI
 - UCHSC Cancer Center Seminar Series, Univ. of Colorado Health Sciences Center, Denver, CO
- 2005
- Hartwell Center for Bioinformatics and Biotechnology, St Jude's Hospital, Memphis, TN
 - Dept. Biochemistry and Molecular Biology, University of Indiana, Indianapolis, IN
 - OSI Pharmaceuticals, Boulder, CO
 - Program in Structural Biology, University of California, Berkeley, CA
 - Department of Chemistry, Yale University, New Haven, CN
 - Centro Nacional de Investigaciones Oncológicas (Spanish National Cancer Centre (CNIO)) Cancer Conference, Madrid, Spain
 - CU-Array Pharma Symposium on Protein Kinases, Boulder, CO
 - Gordon Research Conference on Toxicogenomics, Colby Sawyer College, NH
 - Annual Meeting of the American Society of Mass Spectrometry, San Antonio, TX
 - Gordon Conference on Second Messengers and Protein Phosphorylation, Univ. New England, ME (Vice-Chair)
 - Institute for Complex Adaptive Matter (ICAM) Symposium, UCSD, La Jolla, CA
 - FASEB Symposium on Protein Phosphorylation, Snowmass, CO
 - Annual Meeting of the Medical Scientists Training Program, Aspen, CO
 - Keynote Talk, Institute of Molecule Medicine and Genetics 2005 Retreat at Palm Key, Medical College of Georgia, Augusta GA
 - Neuroscience Seminar Program, Univ. Colorado, Boulder, CO
- 2004
- Keystone Symposium on Proteomics, Santa Fe, NM
 - Keystone Symposium on Protein Kinases and Cancer, Lake Tahoe, CA
 - Department of Chemistry, University of Pennsylvania
 - Dept. Chemistry and Chemical Biology, Harvard University, Cambridge, MA

University Lecture Series, University of Texas, Southwestern, Dallas, TX
Department of Physiology, Columbia University, New York, NY
Cancer Research Center of Hawaii, University of Hawaii at Manoa, Honolulu,
HI

100th Annual Meeting of the American Thoracic Society, Orlando, FL
Annual Meeting of the American Society for Biochemistry and Molecular
Biology, Boston, MA

Gordon Conference on Second Messengers and Protein Phosphorylation,
Meriden, NH

Breast Cancer Research Program Seminar, Vanderbilt University, Nashville,
TN

16th Congress, Int'l Federation of Associations of Anatomists, Kyoto, Japan
American Association for Cancer Research Symposium on Cell Signaling, Key
Biscayne, FL

Nobel Symposium, Stockholm, Sweden

Annual Meeting of the Society for Melanoma Research, Phoenix, AZ

Keynote Talk, Symposium on Functional Proteomics, Korea Society of
Biochemistry and Molecular Biology, Seoul, Korea

Center for Cell Signaling Research, Ewha University, Seoul, Korea

Dept. Physiology & Biophysics, University of California, Irvine, CA

2003

CU-IBM Research Summit, UCHSC, Denver, CO

Proteomics in Diabetes Workshop, NIDDK, NIH, Bethesda, MD

Symposium on Structural Biology, Univ. Texas, Galveston, TX

Dept. of Cell Biology, Harvard Medical School

Dept. of Physiology and Biophysics, Case Western Reserve University,
Cleveland, OH

Eppley Cancer Research Institute, Univ. Nebraska

Merck Frosst Conference series, Clinical Research Institute of Montreal.

Ottawa Health Research Institute, Univ. of Ottawa, Canada

Gordon Conference for Frontiers in Molecular Cell Biology, Tilton Academy,
Tilton, New Hampshire

Cancer Research UK Beatson International Cancer Conference, Glasgow,
Scotland

Salk/EMBL Oncogenes and Growth Control Meeting, San Diego, CA

Annual Meeting of the PanAmerican Society for Pigment Cell Research, Cape Cod,
MA

19th International Congress of Biochemistry and Molecular Biology, Toronto,
Canada

2003 Annual Meeting of the American Association of Pharmaceutical
Scientists, Salt Lake City, Utah

4th Annual Rachmiel Levine Symposium. Advances in Diabetes Research:
From Cell Biology to Cell Therapy, Universal City, CA

10th Annual Meeting of the Society of Free Radical Biology and Medicine,
Seattle, WA

NIH Director's Wednesday Afternoon Lecture, NIH, Bethesda, MD

Workshop for the Protein Kinase Resource, Asilomar, CA
Frontiers in Pharmacology Seminar, New York University Medical Center, NY

- 2002
- Department of Cell Biology, University of Cincinnati, Cincinnati, OH
 - Department of Chemistry, University of Illinois, Chicago, IL
 - Department of Biochemistry, University of Minnesota, Minneapolis, MN
 - Roswell Park Cancer Institute, Buffalo, NY
 - Ben May Institute, University of Chicago, Chicago IL
 - Department of Biochemistry, Michigan State University, East Lansing, MI
 - Research Grand Rounds, H. Lee Moffitt Cancer Center, Tampa FL
 - Annual Meeting of the American Society of Biochemistry and Molecular Biology, New Orleans, LA
 - Van Andel Institute, Grand Rapids, MI
 - Cell Signal Technology, Beverly, MA
 - Department of Cell Biology and Neuroscience, Rutgers University, Piscataway NJ
 - Department of Pharmaceutical Chemistry, University of California, San Francisco
 - The Vanderbilt Conference on Proteomics: The Next Biological Challenge, Vanderbilt University, Nashville TN
 - Department of Biological Sciences, University of California Davis Cancer Center, Sacramento, CA
 - Stowers Institute, Kansas City, MO
 - Keynote Talk: National Neurofibromatosis Foundation International Consortium for the Molecular Biology of NF1 and NF2, Aspen, CO
 - Gordon Conference on Cyclic Nucleotide Phosphodiesterases, South Hadley, MA
 - Boehringer Ingelheim Pharmaceuticals, Ridgefield, CT
 - Array Biopharma, Boulder, CO
 - Plenary seminar, Annual Meeting of the Protein Society, San Diego, CA
 - Sunesis, South San Francisco, CA
 - Agilent Technologies Inc., Palo Alto, CA
 - Department of Chemistry, Brigham Young University, Provo, UT
 - Cellular Proliferation Program at the Siteman Cancer Center, Washington University, St Louis, MO
 - Department of Biochemistry, Albert Einstein College of Medicine, New York, NY
 - Department of Chemistry and Biochemistry, University of California San Diego, La Jolla, CA
- 2001
- Department of Biochemistry, University of Texas, Southwestern Medical Center, Dallas, TX
 - Department of Pharmacology, University of Texas Health Science Center, San Antonio, TX
 - International Symposium on Proteomics and Cell Signaling, Protein Network Research Center, Yonsei University, Seoul, Korea

Annual Meeting of the Association of Biomolecular Research Facilities, San Diego, CA
Department of Biological Sciences, Columbia University, New York, NY
Department of Biochemistry, Virginia Tech, Blacksburg, VA
Department of Biochemistry, University of Western Ontario, London, Ontario
Department of Chemistry, University of California, Berkeley, CA
Distinguished Speaker, Molecular and Cellular Pharmacology Program, University of Wisconsin, Madison
Department of Pharmacology, University of Washington, Seattle, WA
Celltech Chiroscience Inc., Bothell, WA
Gordon Research Conference on Second Messengers and Protein Phosphorylation, Meriden, NH
Department of Toxicology, University of Alabama at Birmingham
Gordon Research Conference on Molecular and Genetic Basis of Cell Proliferation, New London, NH
Somalogic Inc., Boulder, CO
Celgene/Signal Pharmaceuticals, San Diego, CA
Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways, Meriden, NH
Gordon Research Conference on Hormone Action, Meriden, NH
2001 FASEB Summer Conference on Protein Kinases and Phosphorylation, Snowmass, CO
222nd American Chemical Society National Meeting, Chicago, IL
5th International Symposium on Mass Spectrometry in the Health and Life Sciences: Molecular and Cellular Proteomics, San Francisco, CA
UCSF Cancer Center, San Francisco, CA
Symposium on the Cardiovascular System in the Era of Genomics and Proteomics, Université de Montréal, Montreal, Canada
Genentech, South San Francisco, CA

2000 Department of Medical Oncology, University of Colorado Health Sciences Center, Denver, CO
Wendell Griffith Distinguished Lectureship, St. Louis University, St. Louis, MO
Keystone Symposium on Assembly of Signaling Networks, Taos NM
Program in Gene Regulation, Medical College of Georgia, Augusta, GA
Department of Pharmacology, University of Colorado Health Sciences Center, Denver, CO
Department of Chemistry and Biochemistry, University of Denver, Denver, CO
Parke-Davis, Ann Arbor, MI
Tularik, South San Francisco, CA
Department of Biological Sciences, University of California, San Diego, La Jolla, CA
Webb-Waring Institute of Antioxidant Research, University of Colorado Health Sciences Center, Denver, CO

- 1999 Metabolex Proteomics Symposium, Hayward CA
 Biochemical Pharmacology Discussion Group, New York Academy of Sciences, New York NY
 Department of Molecular, Cellular & Developmental Biology, University of California, Santa Barbara, CA
 Gordon Conference on Second Messengers and Protein Phosphorylation, Meriden, NH
 Vascular Biology Conference '99, Osaka, Japan
 Department of Biophysics, Graduate School of Science, Kyoto University, Kyoto, Japan
 Institute of Molecular and Cellular Biosciences, University of Tokyo, Tokyo, Japan
 Schering-Plough Research Institute, Kenilworth, NJ
 National Jewish Medical and Research Center, Denver, CO
- 1998 Graduate Program in Molecular Biology, University of Colorado Health Sciences Center, Denver, CO
 Battelle-Pacific Northwest National Laboratories, Richland, WA
 North Dakota EPSCoR Conference on Protein-Protein Interactions. Grand Forks, ND
 NMHCC 2nd Annual International Conference on Cell Signaling: Signal Transduction and Gene Transcription. San Diego, CA
 Department of Molecular, Cellular and Developmental Biology, University of Colorado, Boulder, CO
 10th International Conference on Second Messengers and Phosphoproteins. Jerusalem, Israel
 Department of Pharmacology, University of Missouri, Columbia, MO
- 1997 Annual Meeting of the Protein Society, Boston, MA
 Annual Meeting of the Research Society on Alcoholism, San Francisco, CA
 Satellite Symposium on Alcohol and Signal Transduction
 Forty Years in Protein Phosphorylation, Seattle, WA (Workshop chair)
 Nordic Course on Cell Stress and Apoptosis, Turku, Finland
 Molecumetics, Seattle, WA
 Department of Pharmacology, University of North Carolina, Chapel Hill, NC
 Department of Physiology, University of Maryland, Baltimore, MD
 Department of Vascular Biology, Scripps Research Institute, La Jolla, CA
 Department of Chemistry and Biochemistry, University of California, San Diego, La Jolla, CA
- 1996 Department of Pharmacology, University of Wisconsin, Madison, WI
 Keystone Symposium on Signal Transduction, Taos, NM
 Annual Meeting of the American Physiological Society, Washington D.C.
 FASEB Summer Research Conference on Transcriptional Regulation during Cell Growth, Differentiation and Development, Snowmass, CO

- NATO/FEBS Advanced Study Institute on Structure and Function of
Interacting Protein Domains in Signal and Energy Transduction,
Acquafredda di Maratea, Italy
Centre de Biochimie-CNRS, Université de Nice
Department of Pharmacology, University of Texas Southwestern, Dallas, TX
Samuel Lunenfeld Cancer Center, Mt. Sinai Hospital, Toronto, Ontario
Department of Biochemistry, University of Western Ontario, London, Ontario
Vollum Institute, University of Oregon Health Sciences Center, Portland, OR
Department of Biological Chemistry, University of Michigan, Ann Arbor, MI
Department of Pathology, Anatomy and Cell Biology, Thomas Jefferson
University, Philadelphia, PA
Department of Medical Oncology, University of Colorado Health Sciences
Center, Denver, CO
- 1995 Department of Biochemistry, Louisiana State University, New Orleans
FASEB Summer Research Conference on Protein Phosphorylation, Copper
Mountain, CO
Dupont-Merck Pharmaceuticals, Wilmington, DE
Amgen, Inc. Boulder, CO
Interdisciplinary Plant Biochemistry and Physiology Workshop, Breckenridge,
CO
- 1994 University of California, San Diego Cancer Center, UCSD, La Jolla, CA
Department of Biochemistry, Loma Linda University, Loma Linda, CA
Somatogen, Inc., Boulder, CO
Department of Biochemistry, Colorado State University, Ft. Collins, CO
Department of Biochemistry, University of Colorado Health Sciences Center,
Denver, CO
Manitoba Institute of Cell Biology, University of Manitoba, Winnipeg, Canada
- 1993 Gordon Conference on Molecular Pharmacology, Oxnard, CA
Department of Pharmacology, University of Colorado Health Sciences Center,
Denver, CO
Eli Lilly Symposium on Signal Transduction, Indianapolis, IN
Department of Medicine, University of Colorado Health Sciences Center,
Denver, CO
- 1992 Gordon Conference on Second Messengers and Protein Phosphorylation,
Meriden, NH
Amgen, Inc. Boulder, CO
- 1991 Department of Pharmacology, University of Texas Southwestern Graduate School,
Dallas, TX
Annual meeting of Society for Neuroscience: Satellite Symposium on
Tyrosine Hydroxylase, New Orleans, LA
FASEB Summer Research Conference on Protein Phosphorylation, Copper
Mountain, CO

- 1990 Annual meeting of American Society of Cell Biology: Minisymposium on Protein Phosphorylation, Houston TX
- 1985 Annual meeting of American Society of Biological Chemistry: Minisymposium on Dopamine β -hydroxylase, Anaheim, CA

VII. RESEARCH AND TRAINING SUPPORT

CURRENT:

NIH R35 GM136392-01

PI: Natalie Ahn

Title: "Molecular and Cellular Dynamics in Mammalian Signal Transduction"

Dates and costs of entire project: 04/01/20 - 03/31/25 \$ 1,900,000 (direct)

NIH T32 GM08759-16 to -20

PI: Natalie Ahn

Title: "Predoctoral training in signaling and cellular regulation"

Dates and costs of entire project: 07/01/16 - 06/30/21 \$ 1,875,480 (direct)

ALSAM Therapeutics Innovation Grant program 01/01/2019 – 12/31/2020 0
calendar

MPI: Natalie Ahn and Nichole Reisdorph

Title: "The role of bioactive lipids in cancer resistance to targeted therapeutics"

Dates and costs of entire project: 01/01/2019 – 12/31/2020 \$ 200,000 (\$100,000 to Ahn)

PENDING:

NIH T32 GM142607-01

PI: Natalie Ahn

Title: "Predoctoral training in signaling and cellular regulation"

Dates and costs of entire project: 07/01/21 - 06/30/26 \$ 2,911,788 (direct)

PAST:

NIH R01 GM114594-01A1

PI: Natalie Ahn

Title: "Linking dynamics to catalysis and inhibition in ERK2"

Dates and costs of entire project: 12/01/15 - 11/30/19 \$ 880,000 (direct)

NIH R01 GM127986-01

PI: Natalie Ahn

Title: "Investigation of the WRAMP structure, a mechanism for directional cell migration"

Dates and costs of entire project: 05/01/18 - 03/31/20 \$ 400,000 (direct)

NIH S10 OD025267-01

PI: Natalie Ahn

Title: Q Exactive HF Nanoflow LC Mass Spectrometry System

Dates and costs of entire project: 02/01/2018 - 01/31/2019 \$ 600,000 (direct)

NIH 3R01GM127986-01S1 NIGMS Diversity Administrative Supplement
Dates and costs of entire project: 05/01/2018 – 03/31/2019 \$ 23,905 (direct)

NIH R01 GM105997-01 (RFA GM-13-004, “Interdisciplinary Collaborations for
Macromolecular Interactions in Cells”)
PIs: Natalie Ahn, Amy Palmer, Erik Snapp, Vladislav Verkhusha
Title: “Technologies to define and map novel interorganelle macromolecular interactions”
Dates and costs of entire project: 04/01/13 - 03/31/18 \$1,000,000 (direct, \$280,000 to Ahn)

NIH T32 GM08759-11 to -15
PI: Natalie Ahn
Title: "Graduate training in signal transduction and cell cycle regulation"
Dates and costs of entire project: 07/01/11 - 06/30/16 \$ 1,498,850 (direct)

U. Colorado - Butcher Award Seed Grant PIs: Natalie Ahn, Amy Palmer
Title: “Revolutionizing the way we look at cells: Inventing organelle biosensors by harnessing
the power of proteomics and live cell imaging”
Dates and costs of current year: 07/01/12 - 06/30/14 \$ 50,000 (direct to Ahn)

Howard Hughes Medical Institute PI: Natalie Ahn
Title: "Biomolecular mass spectrometry."
Dates and costs of entire project: 05/01/94 – 08/31/14 \$ 13 M (direct)

NIH R01 CA 118972-01A2 PI: Natalie Ahn
Title: "Signal Transduction Pathways in Melanoma"
Dates and costs of entire project: 04/01/07-03/31/13 \$ 915,000 (direct)

NIH R01 GM074134-01A2 PI: Natalie Ahn
Title: "Regulation of MAP kinases by protein motions"
Dates and costs of entire project: 01/01/07-12/31/11 \$ 679,500 (direct)

W.M. Keck Foundation Award PI: Natalie Ahn
Title: Defining cellular proteomes by mass spectrometry – Shared Instrumentation
Dates and costs of entire project: 01/2009-12/2012 \$1,200,000 (direct)

NIH T32 GM08759-S1 PI: Natalie Ahn
Title: "ARRA Award: Graduate training in signal transduction and cell cycle regulation"
Dates and costs of entire project: 09/01/09 - 08/31/11 \$ 128,992 (direct)

NIH T32 GM08759-06 PI: Natalie Ahn
Title: "Graduate training in signal transduction and cell cycle regulation"
Dates and costs of entire project: 07/01/06 - 06/30/11 \$ 1,274,338 (direct)

NIH R13 DK075259-01 PI: Natalie Ahn
Title: "2006 'Phosphorylation and G protein Signaling Networks' Gordon Conference"

Dates and costs of entire project: 04/01/06 – 03/31/08 \$ 42,000 (direct)

NIH R01 GM48521-10 PI: Natalie Ahn
 Title: "Biochemical Analysis of the MKK/ERK Pathway"
 Dates and costs of entire project: 12/01/01 - 11/30/05 \$ 660,000 (direct)

NIH T32 GM08759-05 PI: Natalie Ahn
 Title: "Graduate training in signal transduction and cell cycle regulation"
 Dates and costs of entire project: 07/01/05 - 06/30/06 \$ 118,259 (direct)

NIH S10 RR021005-01 PI: Natalie Ahn
 Title: "ABI-4000 QTRAP Mass Spectrometer"
 Dates and costs of entire project: 04/01/05 - 03/31/06 \$ 496,557 (direct)

NIH R01 CA79801-01 PI: Natalie Ahn
 Title: "MAP kinase signaling in hematopoietic differentiation"
 Dates and costs of entire project: 01/01/99 - 12/31/02 \$ 402,717 (direct)

NIH R01 GM48521-06 PI: Natalie Ahn
 Title: "Biochemical Mechanisms of MAP Kinase Kinase-1 Regulation"
 Dates and costs of entire project: 12/01/97 - 11/30/01 \$ 403,726 (direct)

NIH R01 GM48521-01 PI: Natalie Ahn
 Title: Growth Factor Regulation of Protein Kinase Cascades
 Dates and costs of entire project: 09/30/92 - 08/31/97 \$ 513,180 (direct)

Searle Scholarship Award (93-A-112). PI: Natalie Ahn
 Title: Growth Factor Signalling Through Protein Phosphorylation
 Dates and costs of entire project: 07/01/93 - 06/30/96 \$ 162,000 (direct)

Amgen Inc. PI: Natalie Ahn
 Title: Shared Equipment Grant for Young Investigators, 1996, \$20,000 (direct)

Abbott Laboratories. PI: Natalie Ahn
 Title: Shared Equipment Grant for Young Investigators, 1996, \$10,000 (direct)

VIII. TRAINEES (asterisks indicate current group)

I have mentored 27 past or current postdoctoral fellows, 25 undergraduates, and 23 graduate students in my own lab, and served on the thesis committees of 93 graduate students in other labs. Of the 25 postdoctoral fellows who have left my lab, 11 are Associate or Assistant Professors at universities in the U.S., Japan and China, 2 are university teaching instructors, 9 are research scientists in private industry, and 2 are proteomics core facility directors. I have graduated 18 Ph.D. and 2 M.S. students, all but one of whom are pursuing postdoctoral or research scientist careers, and one who is an Associate Professor at U. Washington. In addition, I have served as Director of the

Graduate Training Program in Signaling and Cellular Regulation since 1999, and as I on the T32 training grant associated with this program since 2000.

Postdoctoral Research Fellows and Research Associates

* Laurel Pegram, April 2017-present

Maria Hoh, May 2018-Dec 2021

Scott Stuart, Jan 2010-Aug 2018

Recipient of ACS Postdoctoral Award during training (2011-2014).

Current position: M.D. student, University of Colorado School of Medicine

Mary Katherine Connacher, May 2012-May 2017

Current position: Scientist, Mosaic Biosciences, Boulder CO

Recipient of ACS Postdoctoral Award during training.

Thomas Lee, Apr 2009-present

Current position: Director, Central Analytical Facility, Univ. Colorado Boulder

Jeremy Balsbaugh, Jul 2011-Mar 2017

Current position: Proteomics and Metabolomics Facility Director, U. Connecticut, Storrs, CN

Nan Wang, Nov 2011 – July 2014

Current position: Senior Analytical Chemist, Agriculture and Agri-Food Canada

Jyothi Sethuraman, Mar 2009-Oct 2012

Current position: Principal Scientist, Nurix Therapeutics

Kutralanathan Renganathan, Oct 2007-Oct 2010

Current position: Scientist, ITSI Biosciences, Johnstown, PA

Stephane Houel, Jun 2007-Aug 2011

Current position: Senior Software Product Manager, Thermo Fisher Scientific, Cambridge, MA

Eric S. Witze, Jan 2004- Oct 2010

Current position: Associate Professor, Dept. of Cell Biology, University of Pennsylvania, Philadelphia PA

Recipient of NIH NRSA Postdoctoral Fellowship during training.

John T. Prince, May 2008-Feb 2010

Assistant Professor, Dept. of Chemistry & Biochemistry, Brigham Young University, UT

Current position: Senior Data Science Engineer, 3PL Central American Fork, UT

William M. Old, Jul 2003-Jan 2009

Current position: Assistant Professor, Dept. of Molecular, Cellular and Developmental Biology, Univ. Colorado at Boulder

Zhengzhuang (Kevin) Shi, Jan 2006-Apr 2009

Current position: Assistant Professor, Huazhong University of Science and Technology, China

Megan W. Howard, May 2008-Mar 2009

Assistant Professor of Microbiology, University of Alaska, Anchorage, AK

Current position: Principal Research Scientist, Battelle Memorial Institute, Columbus, OH

Carrie Hughes Croy, Sep 2003-Feb 2009

Current position: Senior Research Scientist, Eli Lilly, Indianapolis, IN

Recipient of ACS Postdoctoral Fellowship Award during training.

Brian Eichelberger, Jan 2005-Dec 2007

Assistant Professor, Dept. of Chemistry, John Brown University, Siloam Springs, AR

Current position: Consumer Laboratory Manager, UL, Fayetteville, AK.

Gretchen Argast, Oct 2002-Aug 2007

- . Current position: Director of Translational Sciences, E-Scape Bio, San Francisco, CA
Recipient of NIH NRSA Postdoctoral Fellowship during training.
Rebecca E. Schweppe, Nov 2000-Mar 2006.
- . Current position: Associate Professor of Medicine-Endocrinology, Univ. Colorado Anschutz
Medical Campus, Aurora, CO
Recipient of Life Sciences Postdoctoral Fellowship during training.
Yukihito Kabuyama, Nov 2000-Sep 2005
- . Current position: Professor, Division of Applied Biochemistry, School of Agriculture,
Utsunomiya University, Tochigi 321-8505, Japan
Karen R. Jonscher, Nov 2000-Jan 2005
Current position: Associate Professor, Harold Hamm Diabetes Center, Dept. of Biochemistry
and Molecular Biology, University of Oklahoma Health Sciences Center,
Oklahoma City, OK
- Claire Haydon Evers, May 2002-Jul 2004
Current position: Professor of Biochemistry and Director of the Center for Proteome
Research, University of Liverpool, UK
Recipient of American Heart Association Postdoctoral Fellowship during training.
- Karine R. Bernard, Feb 1999-Mar 2003
Current position: Instructor, Ecole de Nutrition Holistique, Geneva, Switzerland
- David B. Friedman, Aug 1997-Feb 2000
Current position: Research Associate Professor of Biochemistry and Associate Director,
Vanderbilt-Ingram Cancer Center Proteomics Laboratory, Vanderbilt Univ.
- Paul S. Shapiro, Mar 1995-Sep 1999
Current position: Professor and Chair, Department of Pharmaceutical Sciences, Univ. Maryland,
Baltimore, MD
Recipient of NIH NRSA Postdoctoral Fellowship during training.
- Donna F. Louie, Sep 1994- Aug 1998
Current position: Instructor, Libby Research Academic Program, U. Colorado at Boulder
- Anne M. Whalen, Sep 1994- Sep 1998
Current position: Director, Global Regulatory Affairs, Novartis Pharmaceuticals, Boston, MA

Graduate Students

- * Kristyn Hayashi, 2021-present, Ph.D. candidate, Biochemistry
- * Suzannah Miller, 2017-present, Ph.D. candidate, Biochemistry
Recipient of NSF Graduate Research Fellowship during training (2018-2021).
- Dylan Iverson, 2016-2021, Ph.D., Biochemistry
“Allostery and Conformational Dynamics in Protein Kinase ERK2”
Postdoctoral Fellow, Univ. Colorado Boulder
- Andrew Kavran, 2016-2021, Ph.D. Biochemistry, IQBio Training Program
“Intermittent Drug Treatment of BRAF-V600E Melanoma Cells Delays Resistance by
Adaptive Resensitization to Drug Challenge”
Current position: Postdoctoral Fellow, Bristol Myers Squibb, Boston, MA
- Pelle Simpson, 2017-2018, M.S., University of Amsterdam
Current position: Platform Scientist, Enveda Biosciences, Boulder, CO
- Jennifer Liddle, 2012-2017, Ph.D., Biochemistry
“Biophysical Characterization of MAP Kinase Activation and Regulation”

- Postdoctoral Fellow, Univ. Pennsylvania, Lab of Ben Garcia
Current position: Facility Scientist, Proteomics and Metabolomics Lab,
U. Connecticut, Storrs, CN
- Joel Basken, 2011-2017, Ph.D., MCD Biology
"Specificity of molecular responses to ERK1/2 and MKK1/2 inhibitors in melanoma cells"
Next position: Principal Scientist, Arpeggio Biosciences, Boulder, CO
Current position: Product Manager, Enveda Biosciences, Boulder, CO
- Tianjing Hu, 2009-2015, Ph.D., Biochemistry
"Control of Cell Invasion in Melanoma by a New Gene, FAM129B"
Postdoctoral Fellow, U. Colorado Anschutz Medical Campus, Lab of Timothy
McKinsey
Current position: Senior Scientist, InDevR Inc, Boulder CO
- Yao Xiao, 2010-2015, Ph.D., Biochemistry
"Conformational Dynamics in the Regulation of MAP Kinase, ERK2"
Postdoctoral Fellow, CalTech, Lab of Linda Hsieh-Wilson
Current position: Software Development Engineer, Amazon Inc, San Diego CA
- Kevin Sours, 2005-2011, Ph.D., Biochemistry
"Regulation of MAP Kinase Activation Studied by HX-MS"
Postdoctoral Fellow, Universität des Saarlandes, Lab of Rolf Müller
Current position: Senior Scientist, Syngenta, Durham NC
- Karen Meyer-Arendt, 2005-2011, Ph.D., Biochemistry
"Computational Methods for Improved Peptide and Protein Identification in Proteomics"
Current position: Senior Software Engineer, Columbia Engineering Bootcamps, Portland OR
- Kasey Hammond Coutts, 2005-2010, Ph.D., Biochemistry
"Analysis of B-Raf-V600E Regulated MicroRNAs and Proteins in Melanoma"
Postdoctoral Fellow, U. Colorado Denver, Lab of Mayumi Fujita
Current position: Assistant Research Professor, U. Colorado Anschutz Medical Campus
- Evan Trudeau, 2004-2007, M.S., MCD Biology, March 2007
Current position: Res. Specialist, U. North Carolina, Chapel Hill, NC, Lab of Klaus Hahn
- Elisabeth C. Roberts Solano, 1999-2005, Ph.D., MCD Biology
"Cell Cycle Dependent Regulations of Mitogen Activated Protein Kinases"
Current position: Director, Development, Quark Pharmaceuticals Inc., Boulder, CO
- Mariah C. Ruth Brown, 2003-2005, M.D. Thesis Research, Dept. of Medicine, Yale Univ.
"Surveying the Protein Composition of Human Cell Membranes by Proteomics"
Current position: Associate Professor of Dermatology, Univ. of Colorado Anschutz Medical
Center, Aurora, CO
- Michelle A. Emrick, 1998-2004, Ph.D., Chemistry and Biochemistry
"Mechanistic Studies of Extracellular Signal Regulated Kinase 2"
Postdoctoral Fellow, Univ. of Washington, Lab of William Catterall, U. Washington (2005-2008)
Current position: Research Scientist, Dept. Laboratory Medicine, Univ. Washington, Seattle, WA
- Thomas Lee, 1999-2004, Ph.D., Chemistry and Biochemistry.
"Mitogen Activated Protein Kinase Regulation Investigated by Hydrogen Exchange and
Mass Spectrometry"
Postdoctoral Fellow, U. Wisconsin Madison, Lab of Elizabeth Craig
Current position: Director, Central Analytical Core Facility, U. Colorado, Boulder, CO
- Joel R. Sevensky, 1996-2002, Ph.D., MCD Biology

"Analysis of MKK/ERK Induced Megakaryocyte Differentiation"

Director of Molecular and Microbiology Research, Luca Technologies, Golden, CO

Head of Molecular Science Laboratory, Colorado Dept. of Public Health

Current position: Founder and CEO, Theigen Genomics, Denver, CO

Andrew N. Hoofnagle, 1999-2002, Ph.D., Chemistry and Biochemistry; M.D., 2003

"Activation Induced Changes in Conformational Mobility in the MAP Kinases"

Postdoctoral Fellow, Univ. of Washington, Lab of Jay Heinecke

Current position: Professor, Dept. Laboratory Medicine; Head, Division of Clinical Chemistry;

Director of Clinical Mass Spectrometry, U. Washington, Seattle WA

Jacob L. Todd, 1999-2001, M.S. in Chemistry and Biochemistry

"Nuclear Translocation of Mitogen Activated Protein Kinase Kinase 1 (MKK1) Depends on ERK Phosphorylation Sites"

Current position: Senior Software Engineer, Adcellerant, Boulder, CO

Scott C. Galasinski, 1994-2000, Ph.D., MCD Biology

"Regulation of Mammalian Histone Deacetylases by Phosphorylation"

Senior Group Leader, Abbvie Laboratories, Abbott Park, IL (2008-2016)

Current position: Vice President, Ultra Rare Disease Translational Program Head,

Novartis Gene Therapies, Chicago, IL

Timothy S. Lewis, 1995-2000, Ph.D., Chemistry and Biochemistry

"Identification of Novel MAP kinase Pathway Signaling Targets by Functional Proteomics and Mass Spectrometry"

Current position: Associate Director, Seattle Genetics, Seattle, WA

Sam J. Mansour, 1992-1996, Ph.D., MCD Biology

"Analysis of the oncogenic potential of MAP kinase kinase"

Current position: Unknown

Margaret M. Wall, 1992-1994, M.S. in Basic Sciences

"The role of Mos in skeletal muscle differentiation: Evidence and proposed experiments."

Current position: Patent lawyer

Undergraduates -- Independent Research

Jocelyn Gunn Jan 2022-present

Daniel Lee Aug 2021-present

Jason Haw Sep 2019- May 2020

Steven Sloane Jan 2019-Dec 2019

Bryan Murillo May 2017-March 2019

Amira Saraiti Zainal Sep 2016-May 2017

Kayla O'Connor Dec 2015-May 2016

Mustafa Aydogan June 2014-May 2015

Richard Paucek, September 2014-December 2014

Nicholas Lombardi May-Aug 2012

Hyo-jin Sung May 2010-May 2011

Leah Reid May 2008-Aug 2011

Adam Ring, Aug 2007-May 2010, B.S. 2010

Honors Thesis: "Hydrogen Exchange Mass Spectrometry Reveals Distinct Patterns of Regulated Conformational Mobility in Closely Related MAP Kinases"

Akiko Tanimoto Feb 2007-Dec 2008 (B.S. 2008)

Honors Thesis: "Studies on MP1-p14, a Scaffold for Phosphorylation of ERK2 by MKK1 "

Lia Rottman, Jan 2007-Jul 2007

Kevin Pierce, Oct 2003-Jun 2006

Marcus Lanskey, Oct 2003-Jul 2005

Paul Starkey, Jun 2003-Sep 2005

Holly Asmussen, Oct 2003-May 2004

Heather Asmussen, Oct 2003- May 2004

Joy Wattawa, May-Aug 2002

Alexis Melton, Jan-Dec 2001 (B.S. 2001)

Alex Usorov, Aug-Dec 1999 (B.A. 1999)

Sonia Martinez, 1998-1999 (B.S, 1999)

Kristy Gloor, 1995-1998 (B.A, 1998) Honors Thesis: "Enhancement of Phosphorylation on HMG14 and HMG17 Coincides with an Increase in Their Cytoplasmic Localization"

April Hermann, Aug-Dec 1993 (B.A., 1993)

Kajari Vohra, May-Aug 1993 (B.A., 1994)

Jason W. Gloor, 1992-1993 (B.S., 1994)

Jennifer Jones, May-Aug 1992 (B.A., 1993)

Thesis committees (excluding my own students):

Scott Peterson, Ph.D. 1993, Biochemistry
 Corey Nislow, Ph.D. 1993, MCDB
 Robert Schaeff, Ph.D. 1994, Biochemistry
 Phil Niemark, Ph.D. 1994, MCDB
 Diane Iseley, Ph.D. 1994, Biochemistry
 Gary Silver, Ph.D. 1994, Biochemistry
 Peter Seeberger, Ph.D. 1995, Biochemistry
 Gwen Crooks, Ph.D. 1995, Biochemistry
 Jan Ping Yan, Ph.D. 1995, Biochemistry
 Edina Hall, M.S.. 1995, Biochemistry
 Harry Thompson, M.S.. 1995, Biochemistry
 Steven Drake, Ph.D. 1996, Biochemistry
 Denise Ippensen, Ph.D. 1996, MCDB
 Natasha Singh, Ph.D. 1996, MCDB
 Eric Weiss, Ph.D. 1996, MCDB
 Angela Matassa, B.S. 1996, MCDB
 Mark Danielson, Ph.D. 1997, Biochemistry
 Trent Gu, Ph.D. 1997, MCDB
 Amy Schutz, Ph.D. 1997, MCDB
 Joanna Lowell, Ph.D. 1998, Biochemistry
 Randall Bass, Ph.D. 1998, Biochemistry
 Estelle Steiner, Ph.D. 1998, MCDB
 Derek Sieburth, Ph.D. 1998, MCDB
 Lipita Roy, B.S. 1998, MCDB
 Andrea Wolf, B.S. 1998, MCDB
 Carol Alexander, M.S. 1999, Biochemistry
 Ken Jenkins, Ph.D. 1999, Biochemistry
 Debra Rate, Ph.D. 2000, Biochemistry
 Richard Steet, Ph.D. 2000, Biochemistry
 Chris Dufton, Ph.D. 2000, MCDB
 Chris Mattison, Ph.D. 2000, MCDB
 Rebecca Schweppe, Ph.D. 2000,
 Endocrinology, UCHSC
 Heather Flanagan, Ph.D. 2001, MCDB
 Mark Benson, M.S. 2001, Biochemistry
 Tricia Lively, Ph.D. 2002, Biochemistry
 Ben Lundstad, Ph.D. 2002, Biochemistry
 Susy Kohout, Ph.D. 2002, Biochemistry
 Eduardo Marcora, Ph.D. 2002, MCDB
 Joshua Bornhorst, Ph.D. 2002, Biochemistry
 Anita Seto, Ph.D. 2002, Biochemistry
 James Stroud, Ph.D. 2003, Biochemistry
 Kristina Murphy, Ph.D. 2005, MCDB
 Jennifer Rascher, Ph.D. 2005, Biochemistry
 Tuan Nguyen, Ph.D. 2005, Biochemistry
 Suzanne van Kreeveld, M.S., 2005, MCDB
 Hiu Tom Cheung, Ph.D. 2006, Biochemistry
 Richard Erickson, Ph.D. 2006, Biochemistry
 Liang Guo, Ph.D. 2007, Biochemistry
 Kristen Barthel, Ph.D. 2007, Biochemistry
 Elizabeth Luczak, Ph.D. 2007, MCDB
 Catherine Lozupone, Ph.D. 2007, MCDB
 Sara Symons, M.S., Biochemistry
 Brian Kalet, Ph.D. 2007, Biochemistry
 Ricardo Stephens, Ph.D. 2007, Biochemistry
 Michael Latham, Ph.D. 2008, Biochemistry
 Dan Nickerson, Ph.D., 2008, MCDB
 Rachel Mooney Namba, Ph.D., 2009, Biochemistry
 Stacey Wagner, Ph.D. 2009, Biochemistry
 Schuyler Van Englenberg, Ph.D. 2010, Biochemistry
 Haemi Lee, Ph.D. 2010, Chemistry
 Paul Templeton, Ph.D. 2010, Biochemistry
 Philip Dittmer, Ph.D. 2010, Biochemistry
 Janet McCombs, Ph.D. 2011, Biochemistry
 Jason Magida, Ph.D. 2011, MCDB
 Chris Ebmeier, Ph.D., 2011, Biochemistry
 Matthew Knuesel, Ph.D. 2011, Biochemistry
 Douglas Chapnick, Ph.D. 2012, Biochemistry
 Steve Ponicsan, Ph.D. 2012, Biochemistry
 Jose Miranda, Ph.D. 2012, Biochemistry
 Leslie Morton, Ph.D. 2013, Biochemistry
 Michelle Turco, Ph.D. 2013, Biochemistry
 Junglim Lee, Ph.D. 2014, Biochemistry
 Sarah McQuate, Ph.D. 2014, Biochemistry
 Stephanie Stickel, Ph.D. 2014, MCDB
 Genevieve Park, Ph.D. 2014, Biochemistry
 Samir Singh, Ph.D. 2014, Chem Engr
 Stacey Skaalure, Ph.D. 2014, Chem Engr
 Ling-he Xi, Ph.D. 2015, MCDB
 Christa Blenck, Ph.D. 2016, MCDB
 Samantha O'Hara, Ph.D. 2016, MCDB
 Noah Kastelowitz-Lieberman, Ph.D. 2016, Biochemistry
 Thomas Beadnell, Ph.D. 2017, Dept. Medicine, Div.
 Endocrinology, UCHSC, Denver
 Jacqueline Turner, B.S. Honors 2017, Biochemistry
 Lavan Khandan, Ph.D. 2017, MCDB
 Eric Bunker, Ph.D. 2017, Biochemistry
 Joshua Wheeler, Ph.D. 2018, Biochemistry
 Pamela Doerner, Ph.D. 2018, Biochemistry
 Erin Yu Han, Ph.D. 2018, Biochemistry
 Ayman Alawneh, Ph.D. 2018, Chemistry
 Lynn Sanford, Ph.D. 2019, Biochemistry
 Gretchen Geibel Wettstein, M.S. 2019, MCDB
 Thomas Buckles, Ph.D. 2019, Biochemistry

Thesis committees, cont. (excluding my own students):

Georgiana Salant, Ph.D. May 2020, Biochemistry Justin Moser, Ph.D. May 2020, Biochemistry Chen Yang, Ph.D. July 2020, MCDB George Hayden Swisher, Ph.D. Aug 2020, Biochemistry Nicholas Hill, Ph.D. Nov 2020, Biochemistry Yuxiao Tan, Ph.D. candidate, MCDB Tuiumkan Nishanova, Ph.D. candidate, MCDB Kelsey Dahlgren, Ph.D. candidate, Biochemistry Moshe Gordon, Ph.D. candidate, Biochemistry Humza Ashraf, Ph.D. candidate, Biochemistry	
---	--

IX. CLASSROOM TEACHING

Fall 2021 CHEM 1400, General Chemistry for Majors, 4 cr.

Fall 2020 CHEM 1400, General Chemistry for Majors, 4 cr.

Fall 2019 CHEM 1400, General Chemistry for Majors, 4 cr.

Spring 2018 CHEM 5801, Advanced Topics in Signal Transduction & Cell Cycle Regulation,
 (taught two 75 min classroom sessions. Class Instructor was Xuedong Liu)

Fall 2017 CHEM 5770, Advanced Biochemistry (CORE), 5 cr (team taught with R. Kuchta)

Fall 2017 CHEM 5776, Responsible Conduct of Research, 1 cr (team taught with R. Kuchta)

Spring 2017 CHEM 4720/5720, Metabolic Pathways and Human Disease, 4 cr

Spring 2016 CHEM 4720/5720, Metabolic Pathways and Human Disease, 4 cr

Spring 2015 CHEM 5781, Advanced Biochemistry 2, 3 cr

Fall 2013 CHEM 4731/5731 General Biochemistry 2, 4 cr

Spring 2013 CHEM 5811, Advanced Methods in Protein Sequencing and Analysis, 3 cr

Spring 2011 CHEM 5811, Advanced Methods in Protein Sequencing and Analysis, 3 cr

Spring 2010 CHEM 5801, Advanced Topics in Signal Transduction & Cell Cycle Regulation, 3 cr

Spring 2009 CHEM 5811, Advanced Methods in Protein Sequencing and Analysis, 3 cr

Spring 2007 CHEM 5811, Advanced Methods in Protein Sequencing and Analysis, 3 cr

Fall 2006 CHEM 5821, Special Topics in Signal Transduction and Cell Regulation, 1 cr

Spring 2006 CHEM 5801, Advanced Topics in Signal Transduction & Cell Cycle Regulation, 3 cr

Spring 2006 CHEM 5821, Special Topics in Signal Transduction and Cell Regulation, 1 cr

Spring 2004 CHEM 5781, Advanced Biochemistry 2, 3 cr

Fall 2003, CHEM 5801, Advanced Topics in Signal Transduction & Cell Cycle Regulation, (2
 lectures)

Spring 2003 CHEM 4731/5731, General Biochemistry 2, 3 credit hrs.

Fall 2001, CHEM 5801, Advanced Topics in Signal Transduction & Cell Cycle Regulation, 3 cr

Spring 2000 CHEM 5781, Advanced Biochemistry 2, 3 credit hrs, 8 graduate students

Fall 1999 CHEM 5801, Advanced Topics in Signal Transduction & Cell Cycle Regulation, 3 cr

Fall 1999 CHEM 5821, Special Topics in Signal Transduction & Cell Regulation, 1 cr
Spring 1999 CHEM 5781, Advanced Biochemistry 2, 3 cr
Spring 1998 CHEM 4731/5731, General Biochemistry 2, 3 cr
Spring 1997 CHEM 4731/5731, General Biochemistry 2, 3 cr
Spring 1996 CHEM 4731/5731, General Biochemistry 2, 3 cr
Spring 1995 CHEM 4731/5731, General Biochemistry 2, 3 cr
Spring 1994 CHEM 5781, Advanced Biochemistry 2, 3 cr
Spring 1993 CHEM 5781, Advanced Biochemistry 2, 3 cr