

J. Peter Gogarten

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Education

Ph.D. 7/86 University of Giessen, FRG; Botany (*summa cum laude*)
Diploma 4/82 University of Tübingen, FRG; Botany, Zoology, Microbiology,
Biochemistry

Appointments and Employment History

Fall 2009 Fulbright fellow and Visiting Professor at Tel Aviv University
1/03-present Co-Head of the Bioinformatics Services Facility at the University of
Connecticut Biotechnology Center
9/96-present Full Professor of Molecular and Cell Biology, University of
Connecticut
10/96-present Adjunct Professor of Ecology and Evolutionary Biology, University
of Connecticut
Summers '99-'09 Visiting Professor at the Mannheim University of Applied Sciences
Spring 1996 Visiting Professor at the University of Salzburg, Austria
Fall 1995 Offer to chair the Plant Physiology section at the University of Jena,
FRG; rejected fall 96
9/95-9/96 Associate Professor of Molecular and Cell Biology, University of
Connecticut
3/93-9/98 Co-Head of the Plant Cell Culture Facility of the University of
Connecticut Biotechnology Center
9/89-8/95 Assistant Professor of Molecular and Cell Biology, University of
Connecticut
8/87-8/89 Postdoctoral Fellow in the Laboratory of Prof. Dr. Lincoln Taiz, U.C.
Santa Cruz
5/82-5/87 Research Fellow in the Laboratory of Prof. Dr. F.-W. Bentrup,
Institute for Botany, University of Giessen, FRG
6/80-2/82 Research and Teaching Assistant in Plant Physiology, University of
Tübingen, FRG

Professional Activities

5/2009-present Member of the Connecticut Academy of Science and Engineering
9/2008-present Associate Editor of BMC Bioinformatics
6/2008-present Member of the Executive Council of the International Society for the
Study of the Origin of Life
1/2008-present Associate Editor of BMC Evolutionary Biology
12/2007 Member of BioMed Central's list of 'Hot100' scientists
7/2007-6/2010 Senator of the University of Connecticut Senate

10/2006	Recipient of the Alumni Association Distinguished Faculty Award in Research Excellence
1/05-12/07	Member of the Editorial Board of BMC Evolutionary Biology
1/05-present	Member of the Editorial Board of Biology Direct
6/02-6/07	Associate of the Canadian Institute for Advanced Research Program in Evolutionary Biology
6/01-8/04	Member of the Committee on the Origins and Evolution of Life of the National Academy of Sciences Space Studies Board
9/02-12/02	Visiting researcher at the University of Queensland with Mark Ragan
7/00	Elected chair for the Origin of Life Gordon Conference 2003 (vice-chair 2002)
5/97-00	Member of the Exobiology Discipline Working Group (NASA)
1/96-present	Member of the Editorial Board of <i>Origins of Life and Evolution of the Biosphere</i>
1/00-12/02	Regional Representative, International Society for the Study of the Origin of Life
1/96-12/98	Member of the Editorial Board of <i>Botanica Acta</i>
9/90-9/95	Chair of the Plant Cell and Molecular Biology Program, Dept. Molecular and Cell Biology, University of Connecticut
9/90-present	University of Connecticut Graduate School Faculty
8/87-8/89	Recipient of Fellowship from the German Science Foundation (DFG)
9/87	Recipient of the Justus-Liebig-University prize for the best dissertation in the field of natural sciences during 1986

Reviewer

<i>Agencies</i>	NSF, USDA, DOE, National Research Council, NASA, BARD, Fonds zur Förderung der wissenschaftlichen Forschung (Austria), Israel Science Foundation, Canadian MRC and NSERC, Recherches en sciences et en génie Canada (CRSNG), German Israeli Foundation for Scientific Research and Development,
<i>Journals</i>	Biochem. Biophys. Archives, Biochemistry Journal, Biology Direct, Botanica Acta, BMC Bioinformatics, BMC Genomics, BMC Molecular Evolution, Cell Stress and Chaperones, Comparative Biochemistry, Gene, Genetics, Genome Biology, Genome Research, Geology, Journal Biological Chemistry, Journal for the Origin of Life and Evolution of the Biosphere, Journal of Molecular Biology, Journal of Molecular Evolution, Molecular Biology and Evolution, Microbial Reviews, Nature, Nature Reviews in Microbiology, Plant Cell, Plant Physiology, Proceedings of the National Academy of Sciences, Science, and Trends in Ecology and Evolution
<i>Books</i>	Freeman, Simon and Schuster, Oxford University Press, John Hopkins University Press, MIT Press, and Sinauer

Meetings co-organized:

1. "Horizontal Gene Transfer and the Tree/Web of Life." Symposium at the 2009 ASM

- General Meeting, Philadelphia, May 20, 2009
2. "Lateral Gene Transfer and the Origins of Eukaryotes", Vancouver, British Columbia, May 5-9, 2004
 3. "Gordon Research Conference on the Origin of Life", Chair in Summer 2003
 4. "Gordon Research Conference on the Origin of Life" Co-Chair in Spring 2002,
 5. "Life: from Local Origins to Global Persistence" University of New Hampshire, Durham, June 8-10, 1998
 6. Annual New England Molecular Evolutionary Biologists (NEMEB) Meeting, Storrs, November 1995

Society Memberships

1. International Society for the Study of the Origin of Life
2. American Society for Microbiology
3. Society for Molecular Biology and Evolution
4. American Association for the Advancement of Science
5. New England Complex Systems Institute

Research Interests

Evolution of Microorganisms, Molecular Evolution, Origin and Early Evolution of Cellular Life, Horizontal Gene Transfer, Comparative Genomics, Evolution of Proton Pumping ATPases, Role of Gene Transfer and Gene Duplications, Parasitic Genetic Elements

Current Funding

- "Exploration of Sequence Space and the Evolution of the Genetic Code", PI: J. Peter Gogarten, NASA Exobiology Program, approved (2007-2010), Total award Amount: \$260,507.-
- "Genome-based Investigations into the Nature of the Common Ancestor of the Thermotogales" PI: Kenneth Noll, CoPI: J. P. Gogarten, NASA Exobiology Program, September 1st, 2008 – August 31st, 2011, Total Award Amount: \$597,936
- "Horizontal gene transfer and between phyla relationships", PI: J. Peter Gogarten, CoPIs: Kenneth Noll (UConn), Thane Papke (UConn), Jinling Huang (ECU), Ying Xu (UGA) NSF AToL, 1/1/2009- 12/31/2013, Total award Amount: \$2,500,000.-

PUBLICATIONS AND PRESENTATIONS

Publications in Refereed Journals

1. Olendzenski L, Gogarten JP (2009) Evolution of Genes and Organisms: The Tree/Web of Life in Light of Horizontal Gene Transfer. *Annals of the New York Academy of Sciences* **1178**: 137-145
2. Bickhart DM, Gogarten JP, Lapierre P, Tisa LS, Normand P, Benson DR (2009) Insertion sequence content reflects genome plasticity in strains of the root nodule actinobacterium *Frankia*. *BMC Genomics* **10**(1):468

3. Baptiste E, O'Malley MA, Beiko RG, Ereshefsky M, Gogarten JP, Franklin-Hall L, Lapointe FJ, Dupré J, Dagan T, Boucher Y, Martin W (2009)
Prokaryotic evolution and the tree of life are two different things.
Biology Direct **4**: 34.
4. Zhaxybayeva O, Doolittle WF, Papke RT, Gogarten JP (2009)
Intertwined Evolutionary Histories of Marine *Synechococcus* and *Prochlorococcus marinus*.
Genome Biology and Evolution **1**: 325–339
5. Swithers KS, Gogarten JP, Fournier GP (2009)
Trees in the Web of Life,
Journal of Biology **8**: 54 doi:10.1186/jbiol160
6. Fournier GP, Huang JL, Gogarten JP (2009) Horizontal gene transfer from extinct and extant lineages: biological innovation and the coral of life.
Philos Trans R Soc Lond B Biol Sci 364(1527): 2229-39.
7. Zhaxybayeva O, Swithers KS, Lapierre P, Fournier GP, Bickhart DM, DeBoy RT, Nelson KE, Nesbø CL, Doolittle WF, Gogarten JP, Noll KM (2009)
On the chimeric nature, thermophilic origin and phylogenetic placement of the Thermotogales.
Proc Nat Acad Sci USA 106(14):5865-70
8. Huang J, Gogarten JP (2009)
Ancient gene transfer as a tool in phylogenetic reconstruction.
Methods Mol Biol. **532**: 127-39.
9. Olendzenski L, Gogarten JP (2009) Gene transfer: who benefits?
Methods Mol Biol. **532**: 3-9.
10. Lapierre P, Gogarten JP (2009)
Estimating the size of the bacterial pan-genome
Trends in Genetics, **25**(3): 107-1
11. Huang J, Gogarten JP (2008)
Concerted gene recruitment in early plant evolution.
Genome Biology **9**(7): R109
12. Fournier GP, Gogarten JP (2008)
Evolution of acetoclastic methanogenesis in *Methanosarcina* via horizontal gene transfer from cellulolytic *Clostridia*.
J. Bacteriol. **190**(3):1124-7
13. Hamel L, Nahar N, Popstova MS, Zhaxybayeva O, Gogarten JP (2008)
Unsupervised learning in detection of gene transfer.
J Biomed Biotech **2008**, doi: 10.1155/2008/472719
14. Noll KM, Lapierre P, Gogarten JP and Nanavati DM (2008)
Evolution of mal ABC transporter operons in the Thermococcales and Thermotogales.
BMC Evolutionary Biology 2008, 8:7

15. Fournier G, Gogarten JP (2007):
Signature of a primitive genetic code in ancient protein lineages.
Journal of Molecular Evolution 65(4), 425-436
16. Zhaxybayeva O, Gogarten JP, Doolittle WF (2007)
A hyperconserved protein in *Prochlorococcus* and marine *Synechococcus*.
FEMS Microbiol Lett. 274 (1): 30-4.
17. Huang J, Gogarten JP (2007)
Did an ancient chlamydial endosymbiosis facilitate the establishment of primary plastids?
Genome Biology 8(6): R99
18. Martin W, Dagan T, Koonin EV, Dipippo JL, Gogarten JP, Lake JA (2007)
The Evolution of Eukaryotes, Letter on "Genomics and the irreducible nature of eukaryotic cells".
Science 316, 542-543
19. Poptsova MS, Gogarten JP (2007)
BranchClust: A phylogenetic algorithm for selecting gene families.
BMC Bioinformatics 8:120
20. Gogarten JP, Fournier G, Zhaxybayeva O (2008)
Gene transfer and the reconstruction of life's early history from the molecular record",
Space Science Reviews 135: 115-131
21. Poptsova MS, Gogarten JP (2007)
The power of phylogenetic approaches to detect horizontally transferred genes.
BMC Evolutionary Biology 7:45
22. Alireza G. Senejani and J. Peter Gogarten (2007)
Structural stability and endonuclease activity of a PI-SceI GFP-fusion protein.
Int J Biol Sci 3:205-211
23. Philippe Normand, Pascal Lapierre, Louis S. Tisa, Johann Peter Gogarten, Nicole Alloisio, Emilie Bagnarol, Carla A. Bassi, Alison M. Berry, Derek M. Bickhart, Nathalie Choisne, Arnaud Couloux, Benoit Cournoyer, Stephane Cruveiller, Vincent Daubin, Nadia Demange, Maria Pilar Francino, Eugene Goltsman, Ying Huang, Olga R. Kopp, Laurent Labarre, Alla Lapidus, Celine Lavire, Joelle Marechal, Michele Martinez, Juliana E. Mastronunzio, Beth C. Mullin, James Niemann, Pierre Pujic, Tania Rawnsley, Zoe Rouy, Chantal Schenowitz, Anita Sellstedt, Fernando Tavares, Jeffrey P. Tomkins, David Vallenet, Claudio Valverde, Luis G. Wall, Ying Wang, Claudine Medigue, and David R. Benson (2007)
Genome characteristics of facultatively symbiotic *Frankia* sp. strains reflect host range and host plant biogeography.
Genome Research 17:7-15
24. Gogarten, J. Peter and Elena Hilario (2006)
Inteins, introns, and homing endonucleases: Recent revelations about the life cycle of parasitic genetic elements.
BMC Evolutionary Biology, 6:94

25. Zhaxybayeva O, Gogarten JP, Charlebois RL, Doolittle WF, Papke RT (2006)
Phylogenetic analyses of cyanobacterial genomes: Quantification of horizontal gene transfer events.
Genome Research **16**(9):1099-108.
26. Huang J, Gogarten JP (2006)
Ancient horizontal gene transfer can benefit phylogenetic reconstruction.
Trends in Genetics **22** (7):361-6.
27. Lapierre P, Shial R, Gogarten JP (2006)
Distribution of F- and A/V- type ATPases in *Thermus scotoductus* and Other Closely Related Species.
Systematic and Applied Microbiology **29**(1):15-23
28. Zhaxybayeva O, Lapierre P, Gogarten JP (2006)
Ancient gene duplications and the root(s) of the tree of life.
Protoplasma **227**(1):53-64
29. Gogarten, J. P. and Townsend J. P. (2005)
Horizontal Gene Transfer, Genome Innovation, and Evolution.
Nature Reviews in Microbiology **3**(9):679-687.
30. Huang J., Xu, Y., and Gogarten, J. P. (2005)
The Presence of A Haloarchaeal Type Tyrosyl tRNA Synthetase Marks the Opisthokonts as Monophyletic
Molecular Biology and Evolution, **22**(11):2142-6.
31. Morandi, A., Zhaxybayeva, O., Gogarten, J. P. and Graf, J. (2005)
Evolutionary and Diagnostic Implications of Intragenomic Heterogeneity in the 16S rRNA Gene in *Aeromonas* Strains.
J. Bacteriology **187**:6561–6564.
32. Hamel, L., Zhaxybayeva, O., Gogarten J. P. (2005)
Pentaplot: A Software Tool for the Illustration of Genome Mosaicism.
BMC Bioinformatics **6**:139
33. Sollod, B. L., Wilson, D., Zhaxyeva, O., Gogarten, J. P., Drinkwater, R., King, G. F. (2005)
Were Arachnids the First to use Combinatorial Peptide Libraries?
Peptides **26**:31-139.
34. Harlow, Timothy J, Gogarten, J. Peter, and Ragan, Mark A (2004)
A Hybrid Clustering Approach to Recognition of Protein Families in 114 Microbial Genomes,
BMC Bioinformatics **5**:45.
35. Zhaxybayeva, O., Lapierre, P. and Gogarten J. P. (2004):
Genome Mosaicism and Organismal Lineages.
Trends in Genetics **20** (5):254-260.
36. Zhaxybayeva, Olga and Gogarten, J. Peter (2004)
Cladogenesis, Coalescence and the Evolution of the Three Domains of Life.
Trends in Genetics **20** (4):182-187.

37. Zhaxybayeva O, Hamel L, Raymond J, Gogarten JP (2004): Visualization of the Phylogenetic Content of Five Genomes using Dekapentagonal Maps. *Genome Biology* **5**:R20.
38. Zhaxybayeva, Olga and Gogarten, J. Peter (2003)
An Improved Probability Mapping Approach to Assess Genome Mosaicism, *BMC Genomics* **4**: 37
39. Zhaxybayeva, Olga and Gogarten, J. Peter (2003):
Spliceosomal Introns: New Insights into their Evolution. *Current Biology* **13** (19):R764-6.
40. Gogarten J. P. (2003):
Horizontal Gene Transfer: Gene Swapping Craze Reaches the Eukaryotic Domain. *Current Biology* **13** (2):R53-4
41. Raymond, J., Zhaxybayeva, O., Gogarten, J. P., Gerdes, S., Blankenship, R.E (2002)
Whole Genome Analysis of Photosynthetic Prokaryotes. *Science* **298**:1616-1620.
42. Raymond, J., Zhaxybayeva, O., Gogarten, J.P. and Blankenship, R.E. (2003)
Evolution of Photosynthetic Prokaryotes: A Maximum-Likelihood Mapping Approach. *Philosophical Transactions of the Royal Society: Biological Sciences* **358**: 223-230.
43. Gogarten JP, Doolittle WF, Lawrence JG. (2002)
Prokaryotic Evolution in Light of Gene Transfer. *Molecular Biology and Evolution* **19**: 2226-2238.
44. Gogarten, J. P., Senejani, A. G., Zhaxybayeva, O., Olendzenski, L. and Hilario, E. (2002)
Inteins: Structure, Function, and Evolution. *Annu. Rev. Microbiol.* **56**: 263-287.
45. Zhaxybayeva, Olga, and Gogarten, J. Peter (2002)
Bootstrap, Bayesian Probability and Maximum Likelihood Mapping: Exploring New Tools for Comparative Genome Analyses. *BMC Genomics* **3**:4,1-13.
46. Magnotta, Scot, and Gogarten, J. Peter (2002)
Multi Site Polyadenylation and Transcriptional Response to Stress of a Vacuolar Type H⁺-ATPase Subunit A Gene in *Arabidopsis thaliana*. *BMC Plant Biology* **2**:3 .
47. Senejani, A.G., Hilario, E., and Gogarten, J. P. (2001)
The Intein of the *Thermoplasma* A-ATPase A Subunit: Structure, Evolution and Expression in *E. coli*. *BMC Biochem* **2**: 13,1-10 .
48. Olendzenski L, Liu L, Zhaxybayeva O, Murphey R, Shin D-G, Gogarten JP (2000)
Horizontal Transfer of Archaeal Genes into the Deinococcaceae: Detection by Molecular and Computer Based Approaches. *J. Mol. Evol.* **51**(6): 587-599.

49. Gogarten, J. P., and Olendzenski, L. (1999)
 "Orthologs, Paralogs and Genome Comparisons"
Current Opinion in Genetics and Development **9**(6):630-6.
50. Gogarten, J. P., Murphey, R., Olendzenski, L. (1999)
 Horizontal Gene Transfer: Pitfalls and Promises
Biological Bulletins **196**:359-62.
51. Hilario, E., and Gogarten, J. P. (1998)
 The Prokaryote to Eukaryote Transition Reflected in the Evolution of the V/F/A-ATPase
 Catalytic and Proteolipid Subunits.
J. Mol. Evol. **46**(6):703-715.
52. Liu, L., Laufer, H., Gogarten, P.J., and Wang, M. (1997) cDNA Cloning of a Mandibular
 Organ Inhibiting Hormone from the Spider Crab *Libinia Emarginata*.
Invert Neurosci **3**:199-204.
53. Magnotta, S., and Gogarten, J. P. (1997)
 Characterization and Isolation of a Vacuolar Type H⁺-ATPase Subunit A cDNA From
Arabidopsis thaliana.
Plant Physiol. **115**, 1730.
54. Gogarten, J. P., Olendzenski, L., Hilario, E., Simon, C., and Holsinger, K.E. (1996) "Dating
 the Cenacester of Organisms - Technical Comment", *Science* **274**, 1750-1751.
55. Hilario, E., Gogarten, J. P.(1995)
 The V-ATPase A Subunit Gene (Vma-1) from *Giardia lamblia*.
Biochimica et Biophysica Acta **128**, 94-98.
56. Gogarten, J. P. (1995)
 The Early Evolution of Cellular Life.
Trends Ecol. Evol. **10**:147-151.
57. Mercier, R. W., Gogarten, J. P. (1995)
 A Second Cell Wall Acid Invertase Gene in *Arabidopsis thaliana*.
Plant Physiology, **107**, 659-660.
58. Gogarten-Boekels, M., Hilario, E., Gogarten, J. P. (1995)
 The Effects of Heavy Meteorite Bombardment on the Early Evolution - The Emergence of
 the Three Domains of Life.
Origin of Life and Evolution of the Biosphere **25**, 251-264.
59. Gogarten J. P. (1994)
 Which Is the Most Conserved Group of Proteins? Homology - Orthology, Paralogy,
 Xenology and the Fusion of Independent Lineages.
Journal of Molecular Evolution **39**: 541-543.
60. Mercier, R.W., Chaivisuthangkura, P., Gogarten, J. P. (1993):
 Letter on β -Fructosidase Homologues.
Plant Molecular Biology **23**, 229-230.

61. Hilario, E, Gogarten, J. P. (1993)
Horizontal Transfer of ATPase Genes -the Tree of Life Becomes a Net of Life.
Biosystems **31**, 111-119.
62. Starke, T., Gogarten, J. P. (1993)
A Conserved Intron in the V-ATPase A Subunit Genes of Plants and Algae.
Federation of European Biochemical Societies Letters **315**, 252-258.
63. Gogarten, J. P., Starke, T, Kibak, H., Fichmann, J., Taiz, L. (1992)
Evolution and Isoforms of V-ATPase Subunits.
The Journal of Experimental Biology **172**, 137-147.
64. Gogarten, J. P., Taiz, L. (1992):
Evolution of Proton Pumping ATPases: Rooting the Tree of Life.
Photosynthesis Research **33**, 137-146.
65. Kibak, H., Taiz, L., Starke, T., Bernasconi, P., Gogarten, J. P. (1992)
Evolution of Structure and Function of V-ATPases.
J. Bioenergetics and Biomembranes **24**, 415-424.
66. Gogarten JP, Fichmann J, Braun Y, Morgan L, Styles P, Taiz SL, Delapp K, Taiz L (1992)
The Use of Antisense mRNA to Inhibit the Tonoplast ATPase in Carrot.
The Plant Cell **4**, 851-864.
67. Starke, T., Linkkila, T.P., Gogarten, J. P. (1991)
Two Separate Genes Encode the Catalytic 70kda -ATPase Subunit in *Psilotum* and *Equisetum*.
Zeitschrift Für Naturforschung, A Journal of Biosciences, Section C **46**, 613-620.
68. Linkkila, T.P., Gogarten, J. P. (1991)
Tracing Origins With Molecular Sequences: Rooting the Universal Tree of Life.
Trends in Biochemical Sciences **16**, 287-288.
69. Bernasconi, P., Rausch, T., Gogarten J. P., Taiz, L. (1990)
The H⁺-ATPase Regulatory Subunit of *Methanococcus Thermolithotrophicus*: Amplification of an 800 bp Fragment by Polymerase Chain Reaction.
FEBS Lett. **259**, 227-229.
70. Gogarten JP, Kibak H, Dittrich P, Taiz L, Bowman EJ, Bowman B, Manolson M, Poole R, Date T, Oshima T, Konishi J, Denda K, Yoshida M (1989)
The evolution of the vacuolar H⁺-ATPase: Implications for the origin of eukaryotes.
Proc Nat Acad Sci USA **86**, 6661-6665.
71. Gogarten J. P., Rausch, T., Bernasconi, P., Kibak, H., Taiz, L. (1989)
Molecular Evolution of H⁺-ATPases. I. *Methanococcus* and *Sulfolobus* are Monophyletic with Respect to Eukaryotes and Eubacteria.
Zeitschrift Für Naturforschung, A Journal of Biosciences, Section C **44**, 641-650.
72. Gogarten, J.P., Bentrup, F.-W. (1989)
Substrate specificity of the hexose carrier in the plasmalemma of *Chenopodium* suspension cells probed by transmembrane exchange diffusion.
Planta **178**, 52-60. (pdf)

73. Gogarten, J.P., Bentrup, F.-W. (1989)
The electrogenic proton/hexose carrier in the plasmalemma of *Chenopodium rubrum* suspension cells: Effects of Δc , ΔpH and $\Delta \psi$ on hexose exchange diffusion.
Biochimica et Biophysica Acta **978**, 43-50.
74. Zimniak, L., Dittrich, P., Gogarten, J.P., Kibak, H., Taiz, L. (1988)
The cDNA sequence of the 69kDa subunit of the carrot vacuolar H⁺-ATPase: homology to the beta-chain of F₀F₁-ATPases.
Journal of Biological Chemistry **263**, 9102-9112.
75. Gogarten-Boekels, M., Gogarten, J.P., Bentrup, F.-W. (1988)
Sugar nucleotides dissipate ATP-generated transmembrane pH gradient in Golgi vesicles from suspension-cell protoplasts of *Chenopodium rubrum* L.,
Planta **174**, 333-339.
76. Gogarten, J. P. (1988) Physical properties of the cell-wall of photoautotrophic suspension cells from *Chenopodium rubrum* L..
Planta **174**, 333-339.
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ATP-dependent acidification and tonoplast hyperpolarization in isolated vacuoles from *Chenopodium rubrum* L.,
Proceedings of the National Academy of Sciences U.S.A. **83**, 2431-2433.
78. Gogarten, J.P., Bentrup, F.-W. (1985): Lateral electrophoresis versus 2D-diffusion.
Trends in Biochemical Sciences **10**, 471-472
79. Bentrup, F.-W., Hoffmann, B., Gogarten-Boekels, M., Gogarten, J.P., Baumann, C. (1985) A patch clamp study of tonoplast electrical properties in vacuoles isolated from *Chenopodium rubrum* suspension cells.
Zeitschrift für Naturforschung, A Journal of Biosciences, Section C **40**, 886-890.
80. Gogarten-Boekels, M., Gogarten, J.P., Bentrup, F.-W. (1985)
Kinetics and specificity of ATP-dependent proton translocation measured with acridine orange in microsomal fractions from green suspension cells of *Chenopodium rubrum* L..
Journal of Plant Physiology **118**, 309-325.
81. Gogarten, J.P., Bentrup, F.-W. (1983)
Fluxes and compartmentation of 3-O-methyl-D-glucose in *Riccia fluitans* L.,
Planta **159**, 423-431.
82. Felle, H., Gogarten, J.P., Bentrup, F.-W. (1983):
Phlorizin inhibits the hexose transport across the plasmalemma of *Riccia fluitans*,
Planta **157**, 267-270.
- Books, Dissertations, Non-Refereed Articles, Conference Proceedings, and Book Chapters**
83. Maria B. Gogarten, Johann Peter Gogarten, and Lorraine C. Olendzenski (2009)
Horizontal Gene Transfer: Genomes in Flux
Humana Press; ISBN-13: 978-1603278522

84. Ying Xu and J Peter Gogarten (eds.) (2008) *Computational Methods for Understanding Bacterial and Archaeal Genomes*. Imperial College Press, London, ISBN-13: 978-1-86094-982-1.
85. Hamel, L., Nahar, N., Popstova, M.S., Zhaxybayeva, O. and Gogarten, J.P. (2007) Unsupervised Learning in Spectral Genome Analysis
Proceeding of the IEEE Conference Frontiers in the Convergence of Bioscience and Information Technologies (FBIT 2007), October 2007, pp317 - 321, IEEE Press, ISBN 0-7695-2999-2
86. Nahar, N., Poptsova, M. S., Hamel, L., and Gogarten, J. P. (2007) GPX: A tool for the exploration and visualization of genome evolution.
Proceedings of the IEEE 7th International Symposium on Bioinformatics & Bioengineering (BIBE07) Boston, pp1338 - 1342, IEEE Press, ISBN 1-4244-1509-8.
87. J. Peter Gogarten, Olga Zhaxybayeva (2006): Horizontal gene transfer, gene histories and the root of the tree of life.
In "*Planetary systems and the Origins of Life*", RE Pudritz, PG Higgs and J Stone (eds.), Cambridge University Press.
88. Olendzenski, L., Zhaxybayeva, O., and Gogarten, J. P. (2006): Orthologs, Paralogs and Xenologs in Human and Other Genomes.
In: *Encyclopedia of the Human Genome*, Nature Publishing Group, and
In: *Encyclopedia of Life Sciences*, John Wiley and Sons, Ltd.
(Wiley bought the Encyclopedia and merged articles into their Encyclopedia of Life Sciences)
89. Zhaxybayeva, O., Gogarten, J. P. (2005): Book Review on "Cladistics: A Practical Primer on CD-ROM. By Peter Skelton and Andrew Smith, with accompanying booklet by Neale Monks."
Origins of Life and Evolution of Biospheres **35**:1 69-71.
90. Olendzenski, L. Zhaxybayeva, O., and Gogarten J. P. (2004) A Brief History on Views of Prokaryotic Evolution and Taxonomy.
In "*Microbial Genomes*", C. M. Fraser, T. Read and K. E. Nelson (Eds), Humana Press, pp. 143-154 .
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In: *Horizontal Gene Transfer* 2nd Ed., Syvanen, M. and Kado C. I. (Eds.) Academic Press, London, pp 427-435.
92. Blankenship, R. E., Raymond, J., Lince, M., Larkum, A. W. D., Jermiin, L. S., Lockhart, P. J., Zhaxybayeva, O., Gogarten, J. P. (2001) Evolution of Photosynthetic Antennas and Reaction Centers.
In: PS2001 Proceedings: 12th International Congress on Photosynthesis. P113
CSIRO Publishing: Melbourne, Australia.

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What's in A Tree? Does Horizontal Gene Transfer Determine Microbial Taxonomy?
In: *Cellular Origin and Life in Extreme Habitats*, Vol 4.: Symbioses, Seckbach, J. (Ed.)
Kluwer Academic Publishers, Netherlands. pp. 65-78.
94. Gogarten, J. P., Olendzenski, L. (2001)
Entries on "Bacteria" and "Archaea" for Plant Sciences for Students, Richard Robinson,
Editor. MacMillan Library Reference.
95. Gogarten, J. P., Olendzenski, L. (1999)
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Untersuchungen zu Metabolismus, Transport und Kompartimentierung von 3-O-Methyl-D-Glukose bei *Riccia fluitans* L.,
Diplomarbeit, Universität Tübingen.

Software packages released

1. Gogarten, J.P., Poptsova, M. (2006): BranchClust: A software for the automated assembly of gene families. <http://www.bioinformatics.org/BranchClust/>
2. Khalil, H, Pezzella, L., Zhaxybayeva, O., Gogarten, J. P. (2005) LineageEvolver: A software to simulate genome evolution in the presence of gene transfer, recombination and orthologous replacement. <http://sourceforge.net/projects/lineageevolver/>
3. Hamel, L, Zhaxybayeva, O., Gogarten, J. P. (2004) PentaPlot: A program to dissect genomes based on their mosaic evolutionary history. <http://pentaplot.sourceforge.net/>

Non-refereed Recently Published Abstracts (of at least 20 since 1991)

1. Pascal Lapierre, Olga Zhaxybayeva and J. Peter Gogarten: "Whole genome analyses on the class levels: is there a consensus phylogeny?", *Int. J. Astrobiology*, Supplement 1, 2004: p.48

2. Olga Zhaxybayeva and J. Peter Gogarten: "Cladogenesis, Coalescence and the Evolution of the Three Domains of Life", International Journal of Astrobiology, Supplement 1, 2004: p.52
3. J. P. Gogarten: "The Early Evolution of Life as Reflected in the Molecular Record" Abstract #13038, 2003 General NAI meeting at Arizona State University, Feb. 10-12, 2003, Published in "Astrobiology 2(4)."
4. O. Zhaxybayeva and J. P. Gogarten: "Detecting Ancient Duplications using Whole Genome Data" Abstract #12547, 2003 General NAI meeting at Arizona State University, Feb. 10-12, 2003, Published in "Astrobiology 2(4): 475-476."
5. P. Lapierre, R. Shial, and J. P. Gogarten: Evidence of an A/V type ATPase in *Thermus scotoductus* and Other Closely Related Species Abstract # 12646, 2003 General NAI meeting at Arizona State University, Feb. 10-12, 2003, Published in Astrobiology 2(4)
6. O. Zhaxybayeva, L. Olendzenski and J. P. Gogarten: "Mosaicism in Genes and Genomes", poster presented at the 10th ISSOL Meeting in Oaxaca, Mexico, June 30 – July 5, 2002, to be published in Origin of Life and Evolution of the Biosphere.
7. O. Zhaxybayeva, L. and J. P. Gogarten: "Bootstrap, Bayesian Probability and Maximum Likelihood Mapping: Exploring New Tools for Comparative Genome analyses", poster presented at the 10th ISSOL Meeting in Oaxaca, Mexico, June 30 – July 5, 2002 to be published in Origin of Life and Evolution of the Biosphere.
8. O. Zhaxybayeva, L. Olendzenski and J. P. Gogarten: "Bootstrap, Bayesian Probability and Maximum Likelihood Mapping: Exploring New Tools for Comparative Genome analyses." Poster at the 2nd Astrobiology Science Conference at NASA's Ames Research Center April 7-11, 2002. Published in "Astrobiology."
9. Jason R. Raymond, Robert E. Blankenship, Olga Zhaxybayeva, and J. Peter Gogarten: "Whole Genome Analyses of Photosynthetic Bacteria and the Evolution of Photosynthesis", Poster presented at the Second Astrobiology Science Conference, NASA AMES Research Center, April 7 - 11, 2002. Published in "Astrobiology."

Invited Recent Seminars and Presentations (of at least 79 since Fall 1991)

1. "Population Genetics and the Evolution of higher taxonomic units" invited lecture at the Halifax Workshop on "Perspectives on the Tree of Life", July 30th to August 1st, 2009
2. "The tree-of-life in light of horizontal gene transfer", invited lecture at the "Archaea and the Tree of Life meeting at the Les Treilles Foundation, France, Nay 11-15, 2009
3. "Phylogenetics in Light of Horizontal Gene Transfer", invited seminar at the University of Georgia, Athens, April 10th, 2009
4. "Phylogenetics in Light of Horizontal Gene Transfer", invited seminar at the School of Biology Georgia Institute of Technology, Atlanta, April 9th, 2009
5. "Phylogenetics in Light of Horizontal Gene Transfer", invited seminar at the University of Vermont, Burlington, March 26. 2009
6. "Phylogenetics in Light of Horizontal Gene Transfer", invited seminar at Dalhousie University, Halifax, NS, November 21st, 2008
7. "The Role of Gene Transfer in Innovation and Speciation", invited lecture at the conference on Natural Genetic Engineering and Natural Genome Editing, Salzburg, 3-6 July, 2008
8. "Horizontal Gene Transfer, Organismal Evolution, and Darwin's "Coral of Life."" Departmental seminar at the Department of Biological Sciences at the University of Iowa, October 5th, 2007
9. "From gene trees to organismal evolution: properties of the Most Recent Common Ancestor, early metabolic pathways, and the origin of primary plastids." Invited lecture at the "Structural, Functional & Evolutionary Genomics Gordon Research Conference, , Wellcome Trust Conference Centre, Hinxton, Cambridge, United Kingdom, July 29 - August 3, 2007
10. "Gene Transfer, Symbiosis, Membranes, and Most Recent Common Ancestors" invited presentation at the Annual Meeting of the Society for Molecular Biology and Evolution (SMBE), Dalhousie University, Halifax, Nova Scotia, Canada; June 24-28, 2007
11. "Transferred genes as phylogenetically informative characters and gene transfer from

extinct lineages" invited presentation at the Annual Meeting of the Society for Molecular Biology and Evolution (SMBE), Dalhousie University, Halifax, Nova Scotia, Canada; June 24-28, 2007

12. "Tree-of-Life or Tangled-Web -- How Do Organisms Evolve?" invited seminar at Trinity College, Hartford Connecticut, November 30, 2006
13. "Organismal Evolution: Tree-of-Life or Tangled Web" invited seminar at the Seminar Series "Exceptions and the Unexpected", Swarthmore College, October 27, 2006
14. "Organismal Evolution: Tree-of-Life or Tangled Web" invited seminar, Rutgers University, November 8th, 2006
15. "Molecular Evolution and the Fossil Record: Is the Tree of Life a Tree?" Invited seminar at the Functional Genes Mini Symposium organized by the International GeoBiology Course, Catalina Island, CA, July 8th 2006
16. "Is there a "Tree of Life"?" Invited lecture at the ISSI Astrobiology Workshop "Strategies of Life Detection", Bern, Switzerland, April 24-28, 2006
17. "Oxygen Producing Photosynthesis and the Molecular Record" Invited lecture at the Agouron Institute's Oxygen meeting, Santa Fe, April 6-10, 2006
18. "Horizontal gene transfer and microbial evolution: Is the Tree-of-Life a Tree?" Invited seminar at the Astrobiology Forum, Harvard University, December 13, 2005.
19. "Horizontal gene transfer and microbial evolution: Is the Tree-of-Life a Tree?" Invited seminar at the EEB Department at Yale University, November 30, 2005.
20. "Horizontal gene transfer and microbial evolution: Is the 'Tree of Life' a Tree?" Presentation at the Astrobiology/Exobiology PI meeting, NASA Ames, August 16, 2005.
21. "Prokaryotic Evolution: Is the 'Tree-of-Life' a Tree?" Invited lecture at the World Summit on Evolution in the Galapagos, June 9-12, 2005.
22. "Is the "Tree of Life" a Tree?" talk at the Origins Institute conference/workshop on: "Astrobiology and the Origins of Life", May 24-28, 2005.
23. "Horizontal Gene Transfer and Microbial Evolution: Is the "Tree of Life" a Tree?" Invited Seminar at the Bioinformatics Institute at the Univ. of Georgia, Wednesday, May 4, 2005.
24. "Horizontal gene transfer and the early evolution of life", Invited Departmental Seminar at the Dept. of Biology and Biochemistry at the University of Houston, Texas, January 26, 2005.
25. "Horizontal gene transfer, coalescence and the early evolution of life", Invited lecture at the 15th Annual New England Molecular Evolutionary Biologists Meeting, November 6, 2004
26. "Von *Chenopodium rubrum* zu den Wurzeln des Lebens: Eine persönliche and wissenschaftliche Historie", Lecture at the Friedrich Wilhelm Bentrup Symposium, Salzburg, Austria, October 8th, 2004.
27. "Probability Mapping and Bipartition Analysis to Study Genome Histories" DIMACS Workshop on Reticulated Evolution, DIMACS Center, Rutgers Univ., Sept. 20-22, 2004.
28. "Evolutionary events preceding eukaryotic times: coalescence, ancient duplications, and the nucleocytoplasmic component" Invited presentation at the meeting on "Lateral gene transfer and the origins of eukaryotes Harrison Hot Springs Resort, B.C., May 5-9, 2004.

Other Presentations at Recent Meetings (of at least 100 since Fall 1991)

1. Greg Fournier presented a poster on the "Emergence of a Planetary Methane Ecology: Evolution of Aceticlastic Methanogenesis in Methanosarcinae via horizontal gene transfer from Clostridia" at the SMBE 2007 Annual Meeting, Halifax, NS, Canada, June 24-28
2. Olga Zhaxybayeva presented a poster on "A hyperconserved protein in Prochlorococcus and marine Synechococcus" (Olga Zhaxybayeva, J Peter Gogarten and W. Ford Doolittle) at the SMBE 2007 Annual Meeting, June 24 - June 28, 2007, Halifax, NS, Canada
3. J. Peter Gogarten presented a poster on the "Evolutionary conservation of intron and intein insertion sites" (Alireza G. Senejani and J. Peter Gogarten) at the the Annual Meeting of the Society for Molecular Biology and Evolution (SMBE), Dalhousie University, Halifax, Nova Scotia, Canada; June 24-28, 2007

4. Greg Fournier presented a poster on the "Emergence of a Planetary Methane Ecology: Evolution of Aceticlastic Methanogenesis in Methanosarcinae via horizontal gene transfer from Clostridia" at the The Center for Biodiversity and Conservation's Twelfth Annual Symposium entitled "Small Matters: Microbes and Their Role in Conservation" held at the American Museum of Natural History, New York City, NY, April 26-27, 2007
5. Greg Fournier presented a poster on "Evolution of Methanogenesis: An ancient transfer event?" (Greg Fournier and J. Peter Gogarten) at the Annual Meeting for the Society for Molecular Biology and Evolution (SMBE) Arizona State University, Arizona, May 24-28, 2006
6. Poster on "*The Size of the Bacterial Protein Universe*" (Pascal Lapierre and J. Peter Gogarten) presented by J. Peter Gogarten at the XVII NEMEB Meeting (New England Molecular Evolutionary Biologists), November 4, 2006, University of Massachusetts Amherst, MA
7. "BranchClust: a phylogenetic algorithm for selecting gene families" Maria Poptsova and J. Peter Gogarten; Invited lecture given by Maria Poptsova at the XVII NEMEB Meeting (New England Molecular Evolutionary Biologists), November 4, 2006, University of Massachusetts Amherst, MA
8. Alireza Senejani presented a poster on "Insertion of a new GFP domain into PI-SceI homing endonuclease protein structure" (Alireza G. Senejani and J. Peter Gogarten) at the 3rd Annual North Eastern Structure Symposium (NESS), University of Connecticut, Storrs, CT, U.S.A.; September 30, 2006
9. Invited lecture on "*Automated Assembly of Gene Families and Detection of Horizontally Transferred Genes*" presented by Maria Poptsova (postdoc, Gogarten lab) at the The Life Science Society Computational Systems Bioinformatics Conference (CSB2006) Workshop on Comparative Genome Analysis of Bacterial Genomes and Applications in Stanford, CA, August 14-18, 2006
10. Poster on "*Phylogenetic Evidence for a Methanogenic Sister Group to the Most Recent Common Ancestor*" (Greg Fournier and J. Peter Gogarten) at the 2006 Origin of Life Gordon Research Conference at Bates College in Lewiston, ME, July 23 -28, 2006
11. Poster on "*The Size of the Bacterial Protein Universe*" (Pascal Lapierre and J. Peter Gogarten) at the 2006 Origin of Life Gordon Research Conference at Bates College in Lewiston, ME, July 23 -28, 2006
12. Poster presentation at the Phylogeneomics Conference held in Sainte-Adele, Quebec, Canada, 15-19 March 2006: Maria Poptsova, Timothy J. Harlow, J. Peter Gogarten. "*The Power of Phylogenetic Approaches to Detect Horizontally Transferred Genes*"
13. Poster presentation at the Phylogeneomics Conference held in Sainte-Adele, Quebec, Canada, 15-19 March 2006: Olga Zhaxybayeva, J. Peter Gogarten, Robert Charlebois, W. Ford Doolittle, and R. Thane Papke. "*Phylogenetic analyses of cyanobacterial genomes: Quantification of horizontal gene transfer events.*"
14. Pascal Lapierre (grad student, Gogarten lab) was selected to give an oral presentation on the "*Size of the Prokaryotic Protein Universe*" at the Astrobiology Science Conference, Washington DC, March 26-30, 2006
15. Greg Fournier (grad student, Gogarten lab) is invited to give an oral presentation on "*Evolution of Methanogenesis: An Ancient Transfer Event?*" at the Origin of Life Gordon Research Conference at Bates College in Lewiston, ME July 23-28, 2006
16. Kaiyuan Shi (grad student, Gogarten lab) was selected to give oral presentation on "*Parametric Bootstrap Analyses of Bacterial 16S rRNA Mosaicism*" (collaboration with Olga Zhaxybayeva, and Sushma Samala) at the National Academy of Sciences organized conference on the "Tapestry of Life: Lateral Transfers of Heritable Elements", Beckman Center, Irvine, California USA, on December 12-13, 2005.
17. Poster presented at the NAS Sackler Tapestry of Life Colloquium in Dec 2005: Jinling Huang and J. Peter Gogarten "*Ancient gene transfer benefits phylogenetic reconstruction*"
18. Alireza Senejani (grad student, Gogarten lab) was selected to give an oral presentation on "Homing endonucleases: Clever tools for evolving super selfish genes" at the 16th Annual

New England Molecular Evolutionary Biologists Meeting, Wellesley College, Massachusetts; Nov, 2005

19. Olga Zhaxybayeva, R. Thane Papke, W. Ford Doolittle and J. Peter Gogarten: *Spectral Analyses of Cyanobacterial Genomes: Quantification of Horizontally Transferred Genes*, World Summit on Evolution, Galapagos Islands, Ecuador, June 9-12, 2005.
20. Olga Zhaxybayeva, R. Thane Papke, W. Ford Doolittle and J. Peter Gogarten: *Spectral Analyses of Cyanobacterial Genomes: Quantification of Horizontally Transferred Genes*, Annual Meeting of CIAR Program in Evolutionary Biology, Vancouver Island, BC, September 15-19, 2005.

FUNDING HISTORY

Current Funding

"Horizontal gene transfer and between phyla relationships", PI: J. Peter Gogarten, CoPIs: Kenneth Noll (UConn), Thane Papke (UConn), Jinling Huang (ECU), Ying Xu (UGA) NSF AToL, 1/1/2009- 12/31/2013, Total award Amount: \$2,500,000.-

"Exploration of Sequence Space and the Evolution of the Genetic Code", PI: J. Peter Gogarten, NASA Exobiology Program, approved (2007-2010), Total award Amount: \$260,507.-

"Genome-based Investigations into the Nature of the Common Ancestor of the Thermotogales" PI: Kenneth Noll, CoPI: J. P. Gogarten, NASA Exobiology Program, September 1st, 2008 – August 31st, 2011, Total Award Amount: \$597,936

Past Funding (last five years)

"Exploration of Novel Methods to Visualize Genome Evolution", PI: J. Peter Gogarten, CoPI: Lutz Hamel (URI), NASA AISR Program, 1/1/05-12/31/08, \$368,477.

"Horizontal Gene Transfer Into and Among the Thermotogales: Occurrence and Functional Implications" PI: Kenneth Noll, CoPI: J. Peter Gogarten, NASA Exobiology Program, 09/01/05- 08/31/08, Total Award Amount: \$453,557.

"Exploration of Sequence Space and the Evolution of the Genetic Code" University of Connecticut Research Foundation, 1/1/07-12/31/07; Total Award Amount: 25,000.-

"Reassessing Microbial Evolution in Light of Horizontal Gene Transfer" NSF Microbial Genetics Program, DEB, 3/1/2003 - 2/28/2006, Total Award Amount: \$201,128.

"REU Supplement to Reassessing Microbial Evolution in Light of Horizontal Gene Transfer" NSF Microbial Genetics Program, DEB, 03/01/04- 02/28/07, Total Award Amount: \$10,000.

"Horizontal Gene Transfer in Thermophilic Bacteria: Occurrence and Functional Implications", NASA - Exobiology Program, Kenneth M. Noll, co-investigator, 6/1/02 - 12/31/05, \$251,000 direct costs.

"Use of Simulated Sequence Evolution in an Iterative Parametric Bootstrap Algorithm to Ascertain Long Branch Attraction Artifacts" NASA Exobiology Program, 6/1/01 - 5/31/05, \$135,700.