FREDERICK MICHAEL AUSUBEL
CURRICULUM VITAE

BIRTH DATE:
September 2, 1945

CITIZENSHIP:
U.S.A.

CONTACT INFORMATION:
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PRESENT POSITIONS:
Professor of Genetics, Department of Genetics, Harvard Medical School. Molecular Biologist, Department of Molecular Biology, Massachusetts General Hospital.

EDUCATION:
1. Massachusetts Institute of Technology, Cambridge, Massachusetts. Ph.D. in Biology, 1972.
2. University of Illinois, Urbana, Illinois. B.S. in Chemistry, 1966.

RESEARCH EXPERIENCE:
1. September 1, 1982 to present: Professor of Genetics, Harvard Medical School, Department of Molecular Biology, Massachusetts General Hospital, Boston, Massachusetts. Molecular genetics of nitrogen fixation genes; molecular genetics of *Arabidopsis thaliana*; molecular genetics of host-pathogen interactions.
2. September 1, 1975 to August 31, 1982: Assistant and Associate Professor of Biology, Department of Cellular and Developmental Biology, Harvard University. Molecular genetics of nitrogen fixation genes in *Klebsiella pneumoniae* and *Rhizobium meliloti.*
3. January 1, 1974 to September 1, 1975: Postdoctoral Research Fellow, Harvard University and Universities of Leicester and Sussex. Molecular genetics of nitrogen fixation genes; Somatic cell genetics of *Arabidopsis thaliana.*
4. 1972 and 1973: Instructor and Research Associate, M.I.T. Molecular genetic analysis of nitrogen fixation genes in *Klebsiella pneumoniae.*
5. 1966 to 1971: Graduate Student, M.I.T. Purification and properties of bacteriophage lambda integrase. Thesis supervisor: Dr. Ethan Signer.
6. 1964 to 1965: Undergraduate Senior Thesis, University of Illinois. Purification and properties of borneol dehydrogenase. Thesis Supervisor: Dr. I.C. Gunsalus.

AWARDS AND HONORS:

1. Graduation with Highest Honors from the University of Illinois, 1966.
2. National Science Foundation Graduate Fellowship (1966-1971).
3. The Sterling Hendricks Memorial Prize, Awarded by the United States Department of Agriculture for Contributions to Agricultural Science, August 27, 1984.
4. Elected to membership in the National Academy of Sciences, 1994.
5. Marsho/Schwartz Lecture, University of Maryland, Baltimore County, August 29, 1995.
6. Gottlieb Memorial Lecture, University of Illinois, Urbana, IL, October 22, 1996.
7. Elected to membership in the American Academy of Microbiology, 2002.
8. University of California at Riverside Center for Plant Cell Biology Special Award Lecture, February 4, 2003.
9. Elected to membership in the American Academy of Arts and Sciences, 2003.

TEACHING:

1. 1972-73: Biology 7.011, Introductory Biology Laboratory, M.I.T.
2. 1975-82: Advanced Seminar Courses in Plant Molecular Biology, Molecular Genetics, and Nitrogen Fixation, Harvard University.
3. 1975-82: Biology 11, Plant Physiology, Harvard University.
4. 1982: Biology 7A, Introductory Biology, Harvard University.
5. 1983/84: Biological Chemistry 208, Harvard Medical School. Seminar course in selected topics in molecular biology.
6. 1984-85: Genetics 204, Harvard Medical School. Plant Molecular Biology Seminar
7. 1986-87: Genetics 205, Harvard Medical School. Introduction to Genetic Principles
8. 1992-93: January Proposal Course, Harvard Medical School
9. 1993: Genetics 330, Proposal Writing Course
10. 1994 to 1997: Genetics, Embryology and Reproduction: HMS New Pathway Course for Medical Students

SUMMER TEACHING:

Developed the first Plant Molecular Biology course at Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, June 6 - June 26, 1981. Repeated, June 12 - July 2, 1982.

EDITORIAL BOARDS:

1. *Journal of Bacteriology* (5/1/84 to 12/31/91).
2. *Molecular Plant-Microbe Interactions* (1987-1994). Editor-in-Chief 1992-1994.
3. *Annual Review of Genetics* (1987-1991).
4. *Current Protocols in Molecular Biology* (Founding editor, 1986 to present).
5. *Current Biology* (1993-1995).
6. *Genes to Cells* (1995 to 1998).
7. *Current Opinion in Plant Biology* (1998- present).
8. *Genome Biology* (1999 – present)
9. *Plant Physiology* (2000-2005)
10. *Proceedings of the National Academy of Sciences* (2001 – 2004)
11. *PloS Pathogens* (2005-present)

PANELS, STUDY GROUPS, COMMUNITY SERVICE COMMITTEES, AND REVIEW COMMITTEES:

1. World Food and Nutrition Study. National Academy of Sciences (1976).
2. USDA/NSF Panel on Recombinant DNA (1977-1978).
3. USDA Competitive Grants Program, Nitrogen Fixation Panel (1980-1981).
4. USDA Competitive Grants Program, Nitrogen Fixation Panel (1985).
5. Life Sciences Research Foundation, Postdoctoral Fellowship Program (1983-1986).
6. USDA Competitive Grants Program, Biotechnology Panel (1985).
7. Site Visitor for the New York State Board of Regents Doctoral Review Program (1984).
8. NSF Plant Biology Postdoctoral Fellowship Program (1987 and 1989).
9. NIH, Genetic Basis of Disease Study Section (1988-1992).
10. NSF Eukaryotic Genetics Panel (1989, 1991).
11. Harvard University Milton Fund (1989-1998). Chairman 1993-1998.
12. *Arabidopsis* Biological Resource Center review committee, 1991-1993.
13. North American *Arabidopsis* Steering Committee 1992-1994. Chairman 1994.
14. Sainsbury Laboratory Review Committee, Norwich, UK (Chairman) 1993.
15. Boyce Thompson Institute Review Committee (1993).
16. NSF Plant Genome Panel (1998).
17. Sainsbury Laboratory Review Committee, Norwich, UK (Chairman) 1998.
18. NIH CDF-1 Study Section 2/17/00.
19. NRC Committee on Agricultural Biotechnology, Health and the Environment 2001 –2002.
20. NIH CDF-1 Study Section 6/12/03.
21. NIH ZRG1 F05 Study Section 3/03/05.

GRANTS AWARDED:

1. NSF Genetic Biology: "Transfer of Functioning Nitrogen-Fixing Genes from Bacteria to Plants"; 10/1/75-9/30/76; $150,700.
2. NSF Genetic Biology: "Characterization of Nitrogen-Fixing Genes in *Klebsiella pneumoniae*"; 8/15/78-1/31/81; $190,000.
3. NSF Developmental Biology: "Characterization of the *Rhizobium* Cell Surface Components"; 9/1/78-12/31/81; $150,000.
4. USDA: "Sequencing Nitrogenase Genes from *Rhizobium meliloti* and *Klebsiella pneumoniae*"; 6/27/79-6/30/81; $75,000.
5. USDA: "Molecular Biology of the Petunia Nuclear Genome"; 11/15/80 - 11/14/81; $40,000.
6. FMC Corporation: "Development of Gene Transfer Systems for Plants" 11/16/80-11/15/81; $235,000.
7. NSF Genetic Biology: "Molecular-Genetic Characterization of Nitrogen Fixing Genes in *Klebsiella pneumoniae*"; 7/1/81-12/31/84; $180,000.
8. NSF Developmental Biology: "Molecular and Developmental Genetics of Symbiotic Nitrogen Fixation"; 7/1/81-12/31/84; $204,635.
9. USDA: "Biochemical and Genetic Approaches to the Characterization of *nif* Gene Products" 7/1/81-6/30/84; collaborative effort with Professor W.H. Orme-Johnson of M.I.T.; $l27,500.
10. NIH: "Barrier Functions of the GI Tract in Health and Disease"; Program Project Grant - Core C, Molecular Biology; 4/1/89-3/31/93.
11. USDA: "Regulation of the *Arabidopsis thaliana* Chalcone Synthase Gene"; 9/1/90-8/31/92; $100,000.

12. USDA: "Use of Genomic Subtraction for Cloning Plant Genes"; 8/1/91 - 7/31/94; $150,000.
13. NIH RO1 GM48707 01-04: "Genetic Analysis of the Plant Defense Response"; 1/193-12/31/96; $378,221.
14. Shriners Burns Institute: "Use of a plant model to identify *P. aeruginosa* virulence factors important in burn wound infections"; 1/1/93-12/31/93; $66,129.
15. NIAID IA 25152: "Prevention of group B streptococcal infections in neonatal and infant populations"; 9/30/92-9/29/97; $62,500.
16. Shriners Burns Institute: "Use of a plant model to identify *P. aeruginosa* virulence factors important in burn wound infections"; 1/1/94-12/31/97; $270,606.
17. USDA: "Role of phytoalexins in plant disease resistance"; 7/1/94-6/30/96; $100,000.
18. NSF: "A rapid and inexpensive whole-genome mapping method for *Arabidopsis* using CAPS". 7/15/94-6/30/96; $180,000.
19. NIH P30 DK40561-01A3: W. Allan Walker, P.I., "Clinical Nutrition Research Unit". 10/1/94- 9/30/99; $121,527**.**
20. Monsanto Company: "Use of plant disease resistance genes to genetically engineer the plant defense response". 02/01/95-1/31/98. $744,289.
21. NIH RO1 GM48707 05-08: "Genetic Analysis of the Plant Defense Response"; 1/197-12/31/01; $587,905.
22. Shriners Burns Institute: "Use of a plant model to identify *P. aeruginosa* virulence factors important in burn wound infections"; 1/1/98-12/31/00; $367,808.
23. National Science Foundation: "A rapid and inexpensive whole-genome mapping method for *Arabidopsis* using SNAPS (Single Nucleotide Amplified Polymorphisms), co-domainant ecotype-specific PCR-based markers"; 1/1/98-12/31/00; $273,626.
24. Aventis,.SA: "Use of a *Pseudomonas aeruginosa* multi-host pathogen system to identify novel anti-infective targets"; 10/1/97-11/30/02; ~$4,014,785.
25. NIH P30 DK40561-01A3: W. Allan Walker, P.I., Molecular Biology Core Facility for "Clinical Nutrition Research Unit". 10/1/99- 9/30/05; ~$229,497.
26. NIH RO1 GM48707 09-13. Genetic analysis of the Plant and Nematode Defense Responses. 01/01/01 -- 12/31/04. ~$900,000.
27. NSF DBI-0077692. Jen Sheen, P.I., “Functional analysis of plant MAPK cascades in stress and hormonal signaling. 10/1/00-9/30/05; ~$568,702.
28. NHLBI 1U01 HL66678. Brian Seed, P.I., “Activation of inflammation and stress response pathways”. 9/20/00-7/31/04; ~$819,932.
29. DOE. DE-FG02-ER63445. George Church, P.I., “Microbial ecology, proteogenomics & computational optima,” 10/02-9/10/07; ~$430,000.
30. NSF DBI-01 14783. Xinnian Dong, P.I., Expression profiling plant disease resistance pathways. 09/01/01-8/31/05; ~$718,328.
31. NIH R21 AI05948 3-01. Kim Lewis, P.I., “Novel methods for discovery of anti-microbials,” 03/01/04-03/01/06; ~$54,000.
32. NIH RO1 GM48707 13-16. Genetic analysis of the plant defense response. 01/01/05-12/31/08. $1,269,829.
33. NIH AI064332-01-05. Studies of *Caenorhabditis elegans* innate immunity. 3/1/05-2/28/10. $1,250,000.

UNDERGRADUATE STUDENTS WHO WROTE SENIOR HONORS THESES AND/OR WERE AUTHORS ON AUSUSBEL LABORATORY PUBLICATIONS:

1. Robert Margolskee. The genetic regulation of the *nif* operon of *Klebsiella pneumoniae*: the isolation and characterization of nif mutations independent of glutamine synthetase control. 1976
2. Karen Durbin, 1975.
3. Stephanie Bird, 1976.
4. Adele Peskin. Genetic Regulation of the *nif* operon: The characterization of *Nifty* mutants. 1977.
5. Tom Jean. The use of in vitro hydroxylamine mutagenesis in order to generate mutations on amplifiable plasmids. 1978.
6. Adele Z. Mitchell. Anther culture in petunia. 1979.
7. Belinda Martineau. 1980.
8. Rebekah Zuckerman. Identification and mapping of symbiotic genes in the nitrogen-fxing bacterium *Rhizobium meliloti*. 1982.
9. Sarah L. Gibbons. Identification and characterization of symbiotic nitrogen fixation (*nif*) genes in *Rhizobium meliloti*. 1982.
10. Misuk Bang. 1983.
11. Ilana Stroke, 1983.
12. Jeannie Park. The organization of *nif* genes in *Rhizobium parasponium*. 1983.
13. John Klingensmith. Identification and characterization of symbiotic nitrogen fixation genes in *Rhizobium meliloti* downstream of *nifA*.1985.
14. Margaret Emy. Isolation and cloning of nodulation nenes from a slow-growing *Bradyrhizobium* strain that nodulates peanuts. 1986.
15. Margaret Asomaning. Functional complementation of *Rhizobium* sp. NGR 234 *nodD* Mutants by *nodD* Genes of *Rhizobium meliloti.* 1987.
16. David Fessell. Development of plasmid-based expression vectors and evidence for the thyrotropin hormone receptor of *Yersinia enterocolitica*. 1988
17. Anne Lee Moon. Isolation of mutations influencing the accumulation and activity of *Rhizobium meliloti nifA* in *E. coli.* 1989.
18. Irma Vijn. Two-component protein systems in *Pseudomonas syringae pv. maculicola*. 1990.
19. Timothy Durret. The isolation and characterization of two *Arabidopsis thaliana* mutants displaying aberrant defensin expression. 1999.
20. Lisa Stutius. Physiological and genetic analyses of *edr5*, an *Arabidopsis* enhanced disease resistance mutant. 2001.
21. Christine Lu. Identification and characterization of *AtERF1*, a transcription factor affecting *Arabidopsis* susceptibility to the powdery mildew *Erysiphe orontii*. 2001.
22. Fred Emerson. Characterization of *a Caenorhabditis elgans* mutant with enhanced susceptibility to microbial pathogens. 2001.
23. Lisa Racki. Characterization of the *Arabidopsis thaliana NPR2* gene. 2003 (Hoopes Prize recipient).

FORMER GRADUATE STUDENTS:

1. Gerard E. Riedel, Ph.D. 1975-1981. Senior Scientist, Wyeth Research, Cambridge, Massachusetts.
2. Gary B. Ruvkun, Ph.D. 1977-1982. Professor of Genetics, Harvard Medical School.
3. Rachel Skvirsky, Ph.D. 1975-1982. Associate Professor of Biology, University of Massachusetts, Boston, Massachusetts.

4. Venkatesan Sundaresan, Ph.D. 1977-1982. Professor and Chairman of the Department of of Plant Biology and Agronomy, University of California, Davis, CA.
5. David W. Ow, Ph.D. 1977-1983. Senior Research Scientist, Plant Gene Expression Center, USDA Agricultural Research Service, Albany, CA.
6. Frans J. de Bruijn, Ph.D. 1979-1983. CNRS/INRA Laboratory, Toulouse, France.
7. William J. Buikema, Ph.D., 1979-1985. Research Associate Professor, Department of Molecular Genetics and Cell Biology, University of Chicago, Chicago, Illinois.
8. Deborah Marvel, Ph.D., 1979-1986. Not employed in science.
9. Christopher D. Earl, Ph.D., 1981-1986. Managing Director of the Perseus-Soros BioPharmaceutical Fund, L.P.
10. Katherine Wilson, Ph.D., 1982-1987. Senior Research Scientist, Australian Institute of Marine Science, Townsville, Australia.
11. Mary Honma, Ph.D., 1984-1988. Director Plant Research, Exelixis, Inc.
12. Eric Richards, Ph.D., 1983-1989. Associate Professor of Biology, Washington University, St. Louis.
13. Dan Voytas, Ph.D., 1984-1989. Professor of Genetics, Iowa State University.
14. Rhonda Feinbaum, Ph.D., 1983-1989. Assistant in Molecular Biology, Massachusetts General Hospital.
15. Eva Huala, Ph.D., 1983-1990. Director of TAIR, The Carnegie Institution of Washington, Stanford University.
16. Pablo Guevara, Ph.D., 1988-1993. Physician.
17. Eric Schott, Ph.D., 1987-1993. Postdoctoral Fellow, University of Maryland.
18. Elizabeth Rogers, Ph.D. 1992-1997. Assistant Professor, University of Missouri.
19. Man-Wah Tan, Ph.D., 1993-1997. Assistant Professor of Genetics, Stanford University.
20. Erik Hendrickson, Ph.D., 1988-1997. Senior Fellow, University of Washington, Seattle.
21. Lisa Stevens, Ph.D., 1992-1998. Not employed in science.
22. Sigrid Volko, Ph.D. 1994-1998. Industry Agreement Specialist, Corporate Sponsored Research & Licensing, Johns Hopkins, University, Baltimore, Maryland.
23. Simone Ferrari, Ph.D., 1999-2002. Assistant Professor, University of Padua.
24. Jianping Cui, Ph.D., 1998-2003. Postdoctoral Fellow, Harvard University.
25. Jakob Begun, Ph.D., 2000-2005. Medical Student, Harvard Medical School.

FORMER POSTDOCTORAL FELLOWS (total of 47):

1. Kaaren Janssen. Associate Editor, Cold Spring Harbor Press.
2. Harry Meade. Senior Scientist, Genzyme Inc.
3. Stephan Miller. Senior Scientist, Biogen Inc.
4. Maureen Hanson. Professor of Biology, Cornell University.
5. Harriet Jane Smith. Program Manager, USDA Competitive Grants Office.
6. Sharon Long. Professor of Biology and Dean of the Faculty of Arts and Sciences, Stanford University (Member National Academy of Sciences)
7. Lynn Zimmerman. Professor of Biology, University of Maryland.
8. Jonathan D.G. Jones. 1980-1982. Senior Scientist, Sainsbury Institute, Norwich, England.
9. Wynne Szeto. 1981-1984. Not employed in science.
10. Kathleen Dunn. 1982-1985. Associate Professor of Biology, Boston College.
11. Naomi Lang-Unnasch. 1982-1985. Secondary Teaching Faculty, Department of Epidemiology and International Health, University of Alabama, Birmingham, Alabama.

12. Bruce Burnett. 1983-1986. Molecular Biologist, Wyeth Research, Cambridge, MA.
13. Clive Ronson. 1985-1986. Professor of Microbiology, University of Otago, Dunedin, New Zealand.
14. B. Tracy Nixon. 1983-1987. Associate Professor of Biology, Pennsylvania State University.
15. Neil Olszewski. 1983-1987. Professor of Botany, University of Minnesota.
16. Joanne Chory. 1984-1988. Professor of Biology, Salk Institute, San Diego. (Member, National Academy of Sciences)
17. Craig Bloch. 1984-1988. Assistant Professor of Pediatrics, University of Michigan Medical School.
18. Rebecca Dickstein. 1985-1989. Associate Professor of Biology, University of North Texas, Denton TX.
19. Keith Davis. 1986-1989. Vice President, Agricultural Research, Icoria, formerly Paradigm Genetics, Inc., Triangle Park, NC.
20. James Michel. 1986-1989. Assistant Professor of Medicine, Harvard Medical School
21. Lisa Albright. 1986-1989. Contributing Editor, Current Protocols in Molecular Biology.
22. Donald Straus. 1985-1990. CEO, Genomic Profiling Systems, Inc., Bedford, MA.
23. Gisela Storz. 1989-1991. Group Leader, National Institutes of Health, Bethesda, MD.
24. Andrzej Koneiczny. 1987-1992. Scientist III, TKT, Inc., Cambridge, MA.
25. Tai-Ping Sun. 1988-1992. Associate Professor of Botany, Duke University.
26. Xinnian Dong. 1988-1992. Associate Professor of Botany, Duke University.
27. Jean Greenberg. 1989-1993. Associate Professor of Biology, University of Chicago.
28. Guo-Liang Yu. 1990-1993. President and CEO, Epitomics, Inc., Burlingame, CA.
29. William L. Kubasek. 1989-1994. President and CEO, NorthStar Pharma, Belmont, MA.
30. Kristin K. Wobbe. 1994-1995. Associate Professor of Chemistry and Biochemistry, Worcester Polytechnic Institute, Worcester, MA.
31. Fumiaki Katagiri. 1991-1995. Associate Professor of Biology, University of Minnesota.
32. Jane Glazebrook. 1991-1995. Associate Professor of Biology, University of Minnesota.
33. T. Lynne Reuber. 1992-1998. Senior Scientist, Mendel Biotechnology Inc., Hayward CA.
34. Jacqueline Heard. 1996-1998. Group Leader, Monsanto Corp.
35. Larry Ilag. 1993-1998. Intellectual Property Department, DuPont Agricultural Products, Wilmington, DE.
36. Sandy Wong. 1996-1998, Research Associate, University of Massachusetts Medical School.
37. Michael Mindrinos. 1989-1999. Assistant Director, Stanford University Genome Center, Stanford CA.
38. Laurence Rahme, 1991-1999. Assistant Professor of Surgery, Harvard Medical School.
39. Shalina Mahajan-Miklos, 1995-1999. Senior Scientist, Microbia, Inc., Cambridge, MA.
40. Georg Jander, 1996-1998. Assistant Professor of Biology, Boyce Thompson Institute, Cornell University, Ithaca, NY.
41. Peter Yorgey, 1993-2000. Senior Scientist, Microbia, Inc., Cambridge, MA.
42. Julie Stone, 1997-2001. Assistant Professor, University of Nebraska, Lincoln Nebraska.
43. Tsuneaki Asai, 1996-2001, Assistant Professor, Tokai University School of Medicine, Japan.
44. Alejandro Aballay, 1999-2002, Assistant Professor of Molecular Genetics and Microbiology, Duke University Medical Center.
45. Jacinto Villanueva, 1999-2002, Senior Scientist, Epitomics, Inc., South San Francisco, CA.

46. Eleftherios (Terry) Mylonakis, 2000-2002, Assistant Professor, Massachusetts General Hospital/Harvard Medical School. (Joint postdoctoral fellow with Dr. Stephen Calderwood, Chief of Infectious Diseases, MGH)
47. Mary Wildermuth, 1998-2003, Assistant Professor of Plant and Microbial Biology, University of California, Berkeley.
48. Costi Sifri, 1998-2003, Assistant Professor, University of Virginia Health Sciences. (Joint postdoctoral fellow with Dr. Stephen Calderwood, Chief of Infectious Diseases, MGH)
49. Danielle Garsin, 1999-2003, Assistant Professor, University of Texas Health Sciences Center, Houston, Texas.
50. Dennis Kim, 2000-2005, Assistant Professor, Massachusetts Institute of Technology, Cambridge, MA.

PUBLICATIONS:

1. **Ausubel, F.M., P. Voynow, E. Signer, and J. Mistry** (1971) Purification of proteins determined by two nonessential genes in lambda. In: The Bacteriophage Lambda (A.D. Hershey, ed.) Cold Spring Harbor Laboratory, New York, pp. 395-405.
2. **Ausubel, F.M.** (1974) Radiochemical purification of bacteriophage lambda integrase. ***Nature*** **247**:152-154.
3. **Streicher, S.L., K.T. Shanmugam, F.M. Ausubel, C. Morandi, and R. Goldberg** (1974) Regulation of nitrogen fixation in *Klebsiella pneumoniae*: evidence for a role for glutamine synthetase as a regulator of nitrogenase synthesis. ***J. Bacteriol.*** **120:**815-821.
4. **Shanmugam, K.T., S.L. Streicher, C. Morandi, F.M. Ausubel, R. Goldberg, and R.C. Valentine** (1976) A model for genetic regulation of dinitrogen fixation *(nif)* in *Klebsiella pneumoniae*. In: Proceedings of the First International Symposium on Nitrogen Fixation, Vol. 2 (W.E. Newton and C.J. Nyman, eds.) Washington Univ. Press, Pullman, Washington, pp. 313-319.
5. **Bedbrook, J., and F.M. Ausubel** (1976) Recombination between bacterial plasmids leading to the formation of plasmid multimers. ***Cell*** **9**:707-716.
6. **Cannon, F.C., G.E. Riedel, and F.M. Ausubel** (1977) Recombinant plasmid that carries part of the nitrogen fixation *(nif)* gene cluster of *Klebsiella pneumoniae*. ***Proc. Natl. Acad. Sci. USA*** **74**:2963-2967.
7. **Ausubel, F.M., G.E. Riedel, F.C. Cannon, A. Peskin, and R. Margolskee** (1977) Cloning nitrogen fixing genes from *Klebsiella pneumoniae* i*n vitro* and the isolation of *nif* promoter mutants affecting glutamine synthetase regulation. In: Genetic Engineering for Nitrogen Fixation (A. Hollaender, ed.) Plenum Press, New York, pp. 111-128.
8. **Riedel, G.E., R. Margolskee, F.C. Cannon, A. Peskin, and F.M. Ausubel** (1977) The nitrogen fixation *(nif)* operon of *Klebsiella pneumoniae*: cloning *nif* genes and the isolation of *nif* control mutants. In: Molecular Cloning of Recombinant DNA, Academic Press, New York, pp. 115-132.
9. **Ausubel, F.M., F.C. Cannon, and G.E. Riedel** (1977) Cloning of *his* and *nif* genes from *Klebsiella pneumoniae*. In: Recent Developments in Nitrogen Fixation (W. Newton and J.R. Postgate, eds.) Academic Press, New York, pp. 357-364.
10. **Ausubel, F.M., R. Margolskee, and N. Maizels** (1977) Mutants of *Klebsiella pneumoniae* in which expression of nitrogenase is independent of glutamine synthetase control. In: Recent Developments in Nitrogen Fixation (W. Newton and J.R. Postgate, eds.) Academic Press, New York, pp. 347-356.
11. **Sutcliffe, J.G., and F.M. Ausubel** (1978) Plasmid cloning vectors. In: Genetic Engineering (A.M. Chakrabarty, ed.) CRC Press, Boca Raton, Florida, pp. 83-112.
12. **Greer, H., and F.M. Ausubel** (1979) Radiochemical identification of the *kil* gene product of bacteriophage lambda. ***Virology*** **95**:577-580.

13. **Miller, S.S., F.M. Ausubel, and L. Bogorad** (1979) Cyanobacterial ribonucleic acid polymerases recognize lambda promoters. ***J. Bacteriol.* 140**:246-250.
14. **Bedbrook, J.R., H. Lehrach, and F.M. Ausubel** (1979) Directive segregation is the basis of ColEl plasmid incompatibility. ***Nature* 281**:447-452.
15. **Ausubel, F.M., S.C. Bird, K.J. Durbin, K.A. Janssen, R. Margolskee, and A. Peskin (**1979) Glutamine synthetase mutations which affect expression of nitrogen fixation genes in *Klebsiella pneumoniae*. ***J. Bacteriol.* 140**:597-606.
16. **Riedel, G.E., F.M. Ausubel, and F.C. Cannon** (1979) Physical map of chromosomal nitrogen fixation *(nif)* genes of *Klebsiella pneumoniae*. ***Proc. Natl. Acad. Sci. USA* 76**:2866-2870.
17. **Cannon, F.C., G.E. Riedel, and F.M. Ausubel** (1979) Overlapping sequences of *Klebsiella pneumoniae nif* DNA cloned and characterized. ***Molec. Gen. Genet.* 174**:59-66.
18. **Ausubel, F.M.** (1979) Application of recombinant DNA techniques to the study of nitrogen fixation. In: Recent Advances in Biological Nitrogen Fixation (N.S. Subba Rao, ed.) Oxford Intl. Book House, New Delhi, pp. 257-280.
19. **Ruvkun, G.B., and F.M. Ausubel** (1980) Interspecies homology of nitrogenase genes. ***Proc. Natl. Acad. Sci. USA* 77**:191-195.
20. **Ow, D.W., and F.M. Ausubel** (1980) Recombinant P4 bacteriophages replicate as viable lytic phage particles or as autonomous plasmids in *Klebsiella pneumoniae*. ***Molec. Gen. Genet.* 180:**165-175.
21. **Janssen, K.A., G.E. Riedel, F.M. Ausubel, and F.C. Cannon** (1980) Transcriptional studies with cloned nitrogen-fixing genes. In: Nitrogen Fixation I: Free Living Systems and Chemical Models (W.E. Newton and W.H. Orme-Johnson, eds.) University Park Press, Baltimore, pp. 85-94.
22. **Ausubel, F.M., K.A. Janssen, D.W. Ow, G.E. Riedel, G.B. Ruvkun, F.C. Cannon, and M.C. Cannon** (1980) The use of recombinant DNA techniques in the study of nitrogen fixing genes. In: Nitrogen Fixation (W.D.P. Stewart and J.R. Gallon, eds.) Academic Press, London, pp. 395-419.
23. **Mitchell, A.Z., M.R. Hanson, R.C. Skvirsky, and F.M. Ausubel** (l980) Anther culture of Petunia: Genotypes with high frequency of callus, root, or plantlet formation. ***Z. Pflanzenphysiol*. 100:**131-146.
24. **Martineau, B., M.R. Hanson, and F.M. Ausubel** (1981) Effect of charcoal and hormones on anther culture of Petunia and *Nicotiana*. ***Z. Pflanzenphysiol.* 102**:109-116.
25. **Ruvkun, G.B., and F.M. Ausubel** (1981) A general method for site directed mutagenesis in prokaryotes: Construction of mutations in symbiotic nitrogen fixation genes of *Rhizobium meliloti*. ***Nature* 289**:85-88.
26. **Ausubel, F.M., and F.C. Cannon** (1981) Molecular genetic analysis of *Klebsiella pneumoniae* nitrogen-fixation *(nif)* genes. ***Cold Spring Harbor Symp. on Quant. Biol.* 45**:487-492.
27. **Ruvkun, G.B., S.R. Long, H.M. Meade, and F.M. Ausubel** (1981) Molecular genetics of symbiotic nitrogen fixation. ***Cold Spring Harbor Symp. on Quant. Biol.* 45**:492-499.
28. **Sundaresan, V., and F.M. Ausubel** (1981) Nucleotide sequence of the gene coding for the nitrogenase iron protein from *Klebsiella pneumoniae*. ***J. Biol. Chem.* 256**:2808-2812.
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