

CURRICULUM VITAE

Carl F. Marrs, Ph.D.

Associate Professor

Department of Epidemiology

University of Michigan School of Public Health

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Ann Arbor, Michigan 48109

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PROFESSIONAL EXPERIENCE

Current:

- 1992-present Associate Professor, Department of Epidemiology
University of Michigan School of Public Health
- 1986-present Faculty member, Veterinary Postdoctoral Fellowship Training Program,
Unit for Lab Animal Medicine, University of Michigan
- 1989-present Faculty Member, Molecular Mechanisms of Microbial Pathogenesis
Training Grant, University of Michigan School of Medicine
- 2000-present Faculty Member, Interdisciplinary Program in Infectious Diseases Training
Grant, University of Michigan School of Public Health

Prior:

- 2001-2003; 2007 Interim Director, Public Health Genetics Interdepartmental Concentration
University of Michigan School of Public Health
- 1985-1992 Assistant Professor, Department of Epidemiology,
University of Michigan School of Public Health
- 1996-2000 Faculty Member, Public Health Genetics Interdepartmental Concentration
University of Michigan School of Public Health
- 1986-1996 Faculty Member, Cellular and Molecular Biology Interdepartmental
Program, University of Michigan School of Medicine
- 1990-1993 Faculty Member, Training Program in Vision Research
University of Michigan School of Medicine
- 1983-1984 Scientist, Cetus-Palo Alto Corporation
Palo Alto, California

POSTDOCTORAL TRAINING

- 1984-1985 Postdoctoral Fellow, Department of Medical Microbiology Stanford
University School of Medicine, Mentor: Stanley Falkow, Ph.D.

SENIOR POSTDOCTORAL TRAINING

- 1997 Sabbatical Research, Department of Ophthalmology, University of
Michigan School of Medicine

EDUCATION

- 1976-1982 University of Wisconsin, Madison, Wisconsin, Ph.D. in Molecular Biology,
Thesis Advisor: Martha Howe, Ph.D.
Thesis Title: Transcription of Bacteriophage Mu
- 1973-1975 University of Washington, Seattle, Washington
Bachelor of Science in Chemistry
- 1971-1973 Bellevue Community College, Bellevue, Washington
Associate of Arts in Chemistry (degree awarded with Honors)

PERSONAL

Birthdate: October 7, 1953
Birthplace: Seattle, Washington

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

1977-present American Association for the Advancement of Science
1984-present American Society for Microbiology
1986-present Sigma Xi
1987-1994 Association for Research in Vision and Ophthalmology

HONORS AND AWARDS

1986-present Membership in Sigma Xi
1976-1979 NIH Predoctoral Trainee

CONSULTING POSITIONS

1998 MERRA (technology consulting firm), Ann Arbor, Michigan
1989-1991 Biophotonics Corporation, Ann Arbor, Michigan
1990 Bio Image, Ann Arbor, Michigan
1988 KMS Fusion, Ann Arbor, Michigan

ACADEMIC AND SCIENTIFIC ACTIVITIES

Department of Epidemiology

1991-present Chair, Epidemiology Admissions Committee
2001-2003 Member, Hospital and Molecular Epidemiology Faculty Search Committee
1999-2000 Member, Molecular Epidemiology Faculty Search Committee
1998-1999 Chair, Epidemiology Competency Exam Committee
1998-2002 Member, Epidemiology Doctoral Committee
1997 Member, Epidemiology Infectious Disease Curriculum Committee
1994-1995 Chair, Virology Faculty Search Committee
1994-1995 Member, Epidemiology Task Force for Departmental Merger
1989-1995 Chair, Epidemiology Progress Exam Committee
1991-1995 Member, Epidemiology Departmental Curriculum Committee
1986-1991 Member, Epidemiology Admissions and Student Affairs Committee

School of Public Health

2001-present Member, Michigan Center for Genomics and Public Health
2003-present Member, Executive Committee, Public Health Genetics Interdepartmental Concentration
2000-2003; 2006-2007 Member, Executive Committee, School of Public Health
2001-2003; 2007 Interim Director, Public Health Genetics Interdepartmental Concentration
2001-2002 Chair, Public Health Genetics I.C. Director Search Committee
2000-2001 Member, Public Health Genetics I.C. Director Search Committee
2000-2001 Member, Department of Epidemiology user group, SPH renovations

1989-2000	Member, School of Public Health Recruitment, Admissions and Strategic Planning Committee (now Student Recruitment and Admissions)
1995-2000	Member, Executive Committee, Public Health Genetics Interdepartmental Concentration
1994-1997	Member, School of Public Health Research Council
1995-1996	Member, School of Public Health Task Force on Student Affairs
1992-1994	Member, School of Public Health Curriculum Committee
1990-1992	Member, Task Force on Racial and Cultural Concerns
1987-1991	Mentor, Minority High School Student Research Apprentice Program

University of Michigan

2003-present	Program Committee Member, Undergraduate Microbiology Concentration
2002-present	Associate Chair, University of Michigan Institutional Biosafety Committee
2001-2002	Member, University of Michigan Institutional Biosafety Committee
2000-2001	Member, University of Michigan Biological Research Review Committee
1999-present	Member, Program Committee for the Center for Molecular and Clinical Epidemiology of Infectious Diseases
1999-present	Head, Evolution of Infectious Disease Discussion Group
1996-1999	Chair, University of Michigan Biological Research Review Committee
1995-1997	Member, Rackham Predoctoral Award Review Committee, Division I
1994-1996	Vice-Chair, University of Michigan Biological Research Review Committee
1994-1996	Member, Rackham Divisional Review Board I
1995-1996	Member, Virology Faculty Search Committee, Department of Microbiology
1989-1994	Chair, Admissions Committee for Post-doctoral and M.D. Fellowship trainees, Molecular Mechanisms of Microbial Pathogenesis Training Grant
1992-1994	Member, University of Michigan Biological Research Review Committee
1991-1993	Member, Admissions Committee, Cellular and Molecular Biology Program
1988-1991	Member, Program Committee, Cellular and Molecular Biology Program

National

2001-2002	Member, Eastern Michigan University Biosafety Committee
1995-1996	Chair, Dade MicroScan Young Investigator Award Selection Committee (American Society for Microbiology)
1994-1995	Member, Baxter Diagnostics MicroScan Young Investigator Award Selection Committee (American Society for Microbiology)

Managing Editor for Special Issue

2001-2003	<i>Frontiers in Bioscience</i> , "Molecular Epidemiology of Infectious Diseases"
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Journal Editorial Board

1991-present	Editorial Board, <i>Infection and Immunity</i>
2004-present	Editorial Board, <i>Journal of Clinical Microbiology</i>

Journal Review Activities

Ad hoc reviews for the following journals:

Antimicrobial Agents and Chemotherapy
Applied and Environmental Microbiology
BioTechniques
BMC Microbiology
Clinical Infectious Diseases
Expert Review of Vaccines
FEMS Immunology & Medical Microbiology
Gene
Genome Biology
JAMA
Journal of Bacteriology
Journal of Infectious Diseases
Journal of Medical Microbiology
Journal of Microbiological Methods
Journal of Urology
Molecular Microbiology
PLoS Pathogens
Proceedings of the National Academy of Sciences
Veterinarni Medicina

Grant Review Activities

2008 Ad hoc reviewer for Israel Science Foundation (March 2008)
2007 Member, Special NIH Review Panel ZRG1 IDM-A (02), Bacterial Pathogenes
2004 Member, NIH Special Emphasis Review Panel on Bacterial and Fungal
Pathogenesis
2003-2004 Ad hoc grant reviews, NSF
2003 Member, NIH NIDDK Special Emphasis Review Panel
2002 Ad hoc member, NIH Bacteriology & Mycology-1 Study Section
2002 Member, NIH NIDDK Special Emphasis Review Panel
2001 Ad hoc member, NIH Bacteriology & Mycology-1 Study Section
2000 Chair, NIH NIEHS Special Emphasis Review Panel
1998 Member, NIH NIDDK site visit, University of Washington
1998-2003 Ad hoc reviews, Biomedical Research Council, UM Medical School
1994-2003 Ad hoc grant reviews, USDA
1992-2001 Ad hoc grant reviews, Veteran's Administration
1994-1995 Rackham Divisional Review Board I, University of Michigan
1995 Member, NIH special review, Bacteriology & Mycology-1 Study Section
1994 Member, NIH NIDDK site visit, University of Maryland School of Medicine
1992 Member, NIH NIAID special K11 review, Microbiology & Infectious Disease
Research Committee
1991 Member, Grant Review Panel, Molecular and Cellular Basis of Animal Disease,
USDA
1990 Member, Grant Review Panel, Animal Molecular Biology and Brucellosis, USDA
1990 Ad hoc grant review, Office of Vice-President for Research, UM

Community Service

1998 Lectures to eighth grade science classes, Clague Middle School, Ann Arbor, MI

2003 Panel Member, Ann Arbor Community Reads Project, Ann Arbor Public Library
2007 Radio interview with Lou Perry of WLBY on tuberculosis, June 2, 2007

GRANT SUPPORT

Current:

National Institute of Heart Lung and Blood grant RO1 HL083893, "*H. influenzae* Genes Associated With COPD", J. Gilsdorf, P.I., Carl F. Marrs, Co-Investigator, 10% Effort, \$250,000 first year direct costs.

National Institute of Allergy and Infectious Diseases grant R01 AI51675, "GBS: Epidemiologic Characterization for Gene Discovery", B. Foxman, P.I., Carl F. Marrs, Co-Investigator, 10% Effort, \$351,252 first year direct costs.

National Institute of Deafness and Other Communication Disorders grant R01 DC005840, "*H. influenzae* Genes Associated with Acute Otitis Media", J. Gilsdorf, P.I., Carl F. Marrs, Co-Investigator, 5% Effort, \$250,000 first year direct costs.

National Institute of Dental and Craniofacial Research grant R01 DE014899, "Oral Microbiology Studies in Appalachia", M. Marazita, P.I., Carl F. Marrs, Co-Investigator, 5% Effort, \$295,054 first year direct costs.

National Institute of Allergy and Infectious Diseases grant R01 AI050038-07A1 "Environmental Change and Diarrheal Disease: A Natural Experiment", J. Eisenberg, P.I., Carl F. Marrs, Co-Investigator, 5% Effort.

National Science Foundation grant ER 0811934 "Agricultural Antibiotics & Human Health: A Multiscale Ecological Approach to the Development and Spread of Antibiotic Resistance", J. Eisenberg, P.I., Carl F. Marrs, Co-Investigator, 3% Effort.

Pending:

NIH R01 request - "Does M. Tuberculosis Replicate During Latency", Z. Yang, P.I., Carl F. Marrs, Co-Investigator, 5% Effort. This proposal plans to examine genetic changes in tuberculosis isolates from initial outbreak compared to those after three decades of latency.

NIH R01 request - "Phylogenic, Genome & Phenotype Characterization of Uropathogenic *E. coli*", L. Zhang, P.I., Carl F. Marrs, Co-Investigator, 10% Effort. The goal of this proposal is to use genotypic and phenotypic traits to define uropathogenic *E. coli* and identify genes important in *E. coli* adaptation to growth in human urine.

NIH R01 request - "Extraintestinal *E. coli*: Resistance and Virulence Determinants", L. Zhang, P.I., Carl F. Marrs, Co-Investigator, 3% Effort. The goal of this proposal is to understand the spread of resistance genes and relationship between resistance and virulence of *E. coli* associated with community and nosocomial infections.

Prior :

National Institute of Health grant RO1 AT002086, "Cranberry juice and urinary tract infections", C. Barbosa-Cesnik, P.I. , 01/15/04- 12/31/07, Carl F. Marrs Co-Investigator, 3% Effort, \$65,000 first year direct costs.

National Institute of Diabetes and Digestive and Kidney Disease grant RO1 DK55496, "Molecular Epidemiologic Approaches to UTI Gene Discovery", 03/01/2000 – 02/28/2005, Carl F. Marrs P.I., 30% Effort, \$373,274 current year direct cost.

National Institute of Allergy and Infectious Diseases grant R01-HL68544, "Virulence Related Genetic Variation of *M. tuberculosis* Strains". 09/30/01-06/30/06, Z. Yang, P.I., Carl F. Marrs Co-Investigator, 5% Effort, \$225,000 current year direct costs.

Centers for Disease Control, "Michigan Center for Genomics and Public Health", 09/01/01 - 01/31/04, T. Citrin, P.I., Carl F. Marrs Co-Investigator, 5% Effort, \$204,997 first year direct costs.

National Institute of Allergy and Infectious Disease grant RO1 AI25630, "Molecular and Functional Studies of *H. Influenza pili*," 04/01/98-03/31/02, J. Gilsdorf P.I., Carl F. Marrs Co-Investigator, 15% Effort, \$685,004 four year direct costs.

National Center for Human Genome Research grant R25-HG01511, "Public Health Genetics: An Education Model," S. Caumartin P.I., 12/09/96-11/30/99, \$297,017 three year direct costs. (Carl F. Marrs, replacement P.I. for no-cost extension, 7% Effort, \$51,473 remaining funds)

National Institute of Allergy and Infectious Disease grant R21 AI44868, "Molecular Epidemiology of Group B *Streptococcus*", 09/29/2000-09/28/2001, B. Foxman, P.I., Carl F. Marrs Co-Investigator, 20% Effort, \$457,045 one year direct cost.

National Institute of Diabetes and Digestive and Kidney Disease grant RO1 DK35368, "Heterosexual transmission of urinary tract infection," 12/01/96-11/30/00, B. Foxman, P.I., Carl F. Marrs Co-Investigator, 16% Effort, \$829,944 four year direct costs.

National Institute of Allergy and Infectious Diseases, "Molecular and functional studies of *H. influenzae b pili*", proposed funding period 07/01/94 to 6/30/98, J.R. Gilsdorf, P.I., Carl F. Marrs, Co-Investigator, 20% Effort, \$568,938 four year direct costs.

National Institute of Diabetes and Digestive and Kidney Diseases grant DK47519, "Health behavior, menopause, and urinary tract infection", 09/30/93 to 08/31/97, B. Foxman, P.I., Carl F. Marrs, Co-Investigator, 10% Effort, \$835,944 four year direct costs.

National Institute of Diabetes and Digestive and Kidney Diseases grant # R01 DK35368, "Recurring urinary tract infection: risk factors", 01/07/91 to 06/30/95, B. Foxman, P.I., Carl F. Marrs, Co-Investigator, 20% Effort. \$1,091,029 four year direct costs.

National Eye Institute grant EY07125, "Molecular Studies of type 4 (MePhe) pili," 08/01/90-07/31/95, Carl F. Marrs P.I., 20% Effort, \$679,393 five year direct costs.

National Institute of Allergy and Infectious Disease grant AI25630, "Molecular and Functional Studies of *H. Influenza pili*," 01/01/91-12/31/93, J. Gilsdorf P.I., Carl F. Marrs Co-Investigator, 20% Effort, \$359,555 three year direct costs.

National Eye Institute grant EY07125, "Molecular Studies of the Pili Genes of *Moraxella*," 08/01/87-07/31/90, Carl F. Marrs, P.I., 20% Effort, \$374,788 three year direct costs.

University of Michigan Office of the Vice-President for Research, "Renovation of Autoclaving, Sterilizing and Dishwashing Facilities of the School of Public Health," Carl F. Marrs P.I., 1989, 0% Effort, \$200,000 one time direct costs.

US Department of Agriculture grant 86-CRCR-1-2232, "Molecular studies of the hemolysin gene(s) of *Moraxella bovis*," Carl F. Marrs, P.I., 09/01/86-08/31/89, 20% Effort, \$135,066 three year direct costs.

University of Michigan Rackham Award for Research and Other Creative Activities, Carl F. Marrs P.I., 1986, \$10,000 one year direct costs.

University of Michigan Memorial Phoenix Project Award, Carl F. Marrs P.I., 1986, \$4,500 one year direct costs.

TEACHING

Didactic instruction

2004-present Epid 460 - Introduction to Bacterial Pathogenesis - This 3 credit hour lecture course taught every Fall semester is an undergraduate version of Epid 560 (see below).

2002-present EHS 504 – Genes and the Environment – I give one 2 hr lecture each year on the role of infectious diseases in the evolution of the human genome.

2003-present Epid 511- Introduction to Public Health Genetics. I am co-instructor (50%) of this 3 credit course taught each Fall semester. This class is designed for students interested in the role of genetics in public health who do not already have an extensive genetics background.

2000-2003 Epid 513- Applications in Public Health Genetics. A 0.5 credit hours seminar course specifically designed for Public Health Genetics Interdepartmental Concentration students. It meets both Fall and Winter terms. I co-taught with Pat Peyser in Fall 2000 and was sole instructor Winter 2001. In Fall 2002 and Winter 2003 I co-taught with Pat Peyser and Sharon Kardia.

1996, 2000 Epid 515- Introduction to Genetics in Public Health. I gave one 90 min lecture each year listed.

1993-2004 Epid 519- Introduction to Principles and Methods of Molecular Epidemiology. This was a 3 credit course taught every Winter semester. I was the lead instructor of this team taught course.

1992-1996 Epid 520- Mechanisms of Pathogenesis. I gave an average of four 90 min lectures for each of the five years listed.

2002-present Epid 545 - Viral and Molecular Techniques Laboratory. A 3 credit hour lab course taught each Winter semester, co-taught with Sonja Gerrard (I teach second half of course).

1992 Epid 548- Methods in Experimental Microbiology. A 4 credit hour lab course taught some Spring half-terms. I was sole instructor in 1992.

- 1986-present Epid 560- Mechanisms of bacterial pathogenesis. A 3 credit hour lecture course taught every Fall semester that covers the biochemistry, molecular biology, and genetics of chemotaxis and flagella, pili and adhesins, extracellular proteases, bacterial toxins, invasion and intracellular growth, phase and antigenic variation, gene transfer, LPS, iron, M-proteins, capsules, chemotherapy, antibiotic resistance and global regulation of virulence elements. I am sole instructor.
- 1986-2001 Epid 561- Introduction to Molecular Techniques. A 3 credit hour lab course (plus 8 lectures) taught every Fall semester which teaches molecular biology techniques to study both prokaryotic and eukaryotic organisms. I was sole faculty instructor with help of one teaching assistant.
- 1988-1990 Epid 582- Molecular Epidemiology. A 2 credit hour lecture course taught occasionally during Winter semester. I was the lead instructor of this team taught course.
- 1995 Epid 608- Epidemiology of Diabetes Mellitus. I gave one two hour lecture.
- 2003-present Epid 682 - Current issues in Molecular Epidemiology of Infectious Diseases. Given each Winter semester as one of the core IPID trainingship classes, I gave one two hour presentation in 2003 through 2007. In 2008 I was the lead instructor for this journal club style course.
- 1988-1990 Epid 719-Genetics in Epidemiology. A 1 credit course taught as part of the Graduate Summer Session in Epidemiology each July. I presented a couple of lectures in this course in 1988-1989 and was lead instructor 1990 when the normal instructor was ill.
- 1996 Microbiol 608 - Microbial Pathogenesis. I gave one 90 min lecture.

Readings and independent laboratory classes

- 1987-present Epid 562- Advanced Bacteriology Laboratory. Sole instructor, independent bacteriology research.
- 1986-present Epid 565- Research in Hospital and Molecular Epidemiology. Students do independent research projects and present their results in seminars upon completion of their projects. One of four instructors.
- 1999, 2000, 2004, 2005, 2007, 2008 Epid 624- Readings in Epidemiology. In 1999 this offering was for directed readings in eukaryotic genetics. In 2000 and 2008 this offering was for directed readings in molecular epidemiology. In 2004 this offering was for directed readings in evolution of infectious disease. In 2005 this offering was for directed readings in diabetes. In 2007 this offering was directed at approaches to teaching molecular and bacterial laboratory classes. Sole instructor.
- 2001 Epid 659- Applications of Epidemiology. Second reader for one general epidemiology students analysis project.
- 1991-1994 Epid 890- Readings in Epidemiologic Science. A 2 credit hour student seminar series taught both Fall and Winter semesters each year in which students

- present and critique relevant current literature. I was one of 3 to 5 faculty involved in this course.
- 2003-2006 Epid 890- Readings in Epidemiologic Science. Students gave a 50-minute presentation as part of the departmental seminar series. One faculty member worked with student in developing the seminar and then critiqued it afterwards.
- 2001 Epid 891 – Advanced Readings in Epidemiologic Science.
- 1988, 1991 Epid 974- Research in Epidemiologic Science. Sole instructor of independent research projects.
- 1988-present Epid 970- Research in Epidemiology. Sole instructor of independent research projects.
- 1987-present Epid 990- Dissertation research/pre-candidate.
- 1988-present Epid 995- Dissertation research/candidate.
- 1988 I was lead instructor of a team taught one day class "Molecular Epidemiology" presented at the start of the Annual Meeting of the American College of Epidemiology.

Post-doctoral training in my laboratory

Tara Smith, Ph.D., 2002-2004. Tara was co-mentored by Dr. Betsy Foxman. Current position, Assistant Professor, University of Iowa.

Wendy J. Watson, M.D., 1990-1994, current position: Associate Director of Clinical Research, Wyeth Lederle Vaccines and Pediatrics.

David Brammer, D.V.M., 1991-1992, current position: Scientist, Parke-Davis, Ann Arbor, MI.

Karla Fulks D.V.M., 1986-1987, current position: Scientist, Merck, Sharpe & Dohme Research Labs, Rahway, New Jersey.

Doctoral students trained in my laboratory

<u>Graduated Students</u>	<u>Year Doctoral Degree Obtained</u>
Patricia Juliao (co-chair with Janet Gilsdorf)	2006
Shona Dalal (co-chair with Betsy Foxman)	2005
Stephanie Borchartd (co-chair with Betsy Foxman)	2004
Rich Bauer (co-chair with Betsy Foxman)	2003
Shannon Manning (co-chair with Betsy Foxman)	2001
Chih-Ching Chang	1999
Lixin Zhang (co-chair with Betsy Foxman)	1999
Kirk W. McCrea	1995
Patricia A. Somsel (co-chair with Betsy Foxman)	1994
Meredith A.M. Hackel	1993
Susan Weir	1993
Oswald D'Auvergne (co-chair with Steven Meshnick)	1993

Frank Rozsa

1991

Current Students

2006-present Nathan LaCross (co-chair with Janet Gilsdorf)

Doctoral students on whose thesis committees I served

<u>Graduated Students</u>	<u>Department</u>	<u>Year Doctoral Degree Obtained</u>
Anne Marie France	Epidemiology	2008
Sarah Talarico	Epidemiology	2007
Rebecca Wiesner	Microbiology and Immunology	2007
Ying Kong	Epidemiology	2006
Clarise Rivera Starr	Microbiology and Immunology	2006
Hui-Ling Yen	Epidemiology	2005
Christopher E. Kazor	Oral Health Sciences	2002
Suzanne Renee Lybarger	Biology	2002
Kittinan Komolpis	Chemical Engineering	2001
Brian Hammer	Microbiology and Immunology	2001
Gavin Welch	Epidemiology	2001
Erika H. De Boever	Oral Biology	2001
David S. Cho	Epidemiology	2000
Amrita D. Joshi	Microbiology and Immunology	2000
Jennifer St. Sauver	Epidemiology	1999
Ana E. Perez-Matos	Biology	1999
Thersa M. Sweet	Epidemiology	1998
Mehrnaz Gharaee-Kermani	Epidemiology	1996
Darren E. Higgins	Microbiology and Immunology	1995
James E. Rogers	Microbiology and Immunology	1995
Dominic M. Justewicz	Epidemiology	1994
I-Kung Tsai	Epidemiology	1994
Jeffrey P. Massey	Epidemiology	1993
Yan A. Su	Oral Biology	1992
Mark C. Sulavik	Microbiology and Immunology	1992
Linda T. Pontius	Microbiology and Immunology	1991
Mary M. Vickerman	Microbiology and Immunology	1991
M. Louise Herlocher	Epidemiology	1989
James L. VandenBosch	Microbiology and Immunology	1988
Elaine A. Best	Biology	1988
Elizabeth E. Ehrenfeld	Oral Biology	1986

Current Students

Carla Talarico	Epidemiology
Tory Hendry	Ecology and Evolutionary Biology
Meghan Milbrath	Environmental Health Sciences
Tiffany Tsang	Microbiology and Immunology

External Thesis Examiner for foreign Ph.D. degrees

Eric K. Moses, 1993, Monash University, Clayton, Melbourne, Victoria, AUSTRALIA

Mathew Hobbs, 1990, University of New South Wales, Kensington, New South Wales, AUSTRALIA

Other Ph.D. training

1992 Gillian Wood, a doctoral student from the University of Queensland, Australia carried out a three week research project in my lab.

1988-1989 Tone Tonjum, an MD and doctoral student from Oslo, Norway did research in my lab.

Masters of Public Health students

From 1986 to Spring, 2008 a total of 44 Master's students did their independent research (Epid 565) projects in my laboratory.

From 1986 to Spring, 2008 a total of 117 Master's students were advised by me while carrying out their Epid 565 projects outside the Dept. of Epidemiology.

Undergraduates trained in my laboratory

Fifteen undergraduates have carried out research in my laboratory.

INVITED PRESENTATIONS

2003 Division of Infectious Diseases, University of California – Berkeley, School of Public Health, "Molecular Epidemiologic Approaches to Virulence Gene Discovery in Pathogenic Bacteria".

2003 Department of Microbiology & Immunology, University of Maryland, Baltimore, "Molecular Epidemiologic Approaches to Virulence Gene Discovery in Pathogenic Bacteria".

2003 Department of Microbiology, University of Washington, "Molecular Epidemiologic Approaches to Virulence Gene Discovery in Pathogenic Bacteria".

1995 Schloss Ringberg Workshop on Type 4 pili - biogenesis, adhesins, export, and DNA import. Tegernsee, GERMANY, "Type 4 pili of *Kingella denitrificans*".

1992 Department of Microbiology, Medical College of Ohio, "Studies on Type 4 Pili".

1990 International Symposium: Applications of Molecular Biology in Diagnosis of Infectious Diseases, Oslo, Norway, "Studies on Type 4 Pili of *Neisseriaceae*".

1989 Department of Microbiology and Immunology, University of Tennessee-Memphis, "Prevalence and Genetics of Type 4 Pili".

PUBLICATIONS (Peer Reviewed)

1. **Marrs, C.F.**, and M.M. Howe. 1983. *Avall* and *BglI* restriction maps of bacteriophage Mu. *Virology* **126**:563-575.
2. Waggoner, B.T., **C.F. Marrs**, M.M. Howe, and M.L. Pato. 1984. Multiple factors and processes involved in host cell killing by bacteriophage Mu: Characterization and mapping. *Virology* **136**:168-185.

3. **Marrs, C.F.**, G. Schoolnik, J.M. Koomey, J. Hardy, J. Rothbard, and S. Falkow. 1985. Cloning and sequencing of a *Moraxella bovis* pilin gene. J. Bacteriol. **163**:132-139.
4. **Marrs, C.F.**, W.W. Ruehl, G.K. Schoolnik, and S. Falkow. 1988. Pili gene phase variation of *Moraxella bovis* is caused by an inversion of the pilin genes. J. Bacteriol. **170**:3032-3039.
5. Ruehl, W.W., **C.F. Marrs**, R. Fernandez, S. Falkow, and G.K. Schoolnik. 1988. Purification, characterization, and pathogenicity of *Moraxella bovis* pili. J. Exp. Med. **168**:983-1002.
6. **Marrs, C.F.**, and M.M. Howe. 1990. Kinetics and regulation of transcription of bacteriophage Mu. Virology **174**:192-203.
7. Fulks, K.A., **C.F. Marrs**, S.P. Stevens, and M.R. Green. 1990. Sequence analysis of the inversion region containing the pilin genes of *Moraxella bovis*. J. Bacteriol. **172**:310-316.
8. Gilsdorf, J.R., **C.F. Marrs**, K.W. McCrea, and L.J. Forney. 1990. Cloning, expression, and sequence analysis of the *Haemophilus influenzae* type b M43p⁺ pilin gene. Infect. Immun. **58**:1065-1072.
9. **Marrs, C.F.**, and S. Weir. 1990. Pili (fimbriae) of *Branhamella* species. Am. J. Med. **88(5A)**:36S-40S.
10. Beard, M.K.M., J.S. Mattick, L.J. Moore, M.R. Mott, **C.F. Marrs**, and J.R. Egerton. 1990. Morphogenetic expression of *Moraxella bovis* fimbriae (pili) in *Pseudomonas aeruginosa*. J. Bacteriol. **172**:2601-2607.
11. **Marrs, C.F.**, F.W. Rozsa, M. Hackel, S.P. Stevens, and A.C. Glasgow. 1990. Identification, cloning and sequencing of *piv*, a new gene involved in inverting the pilin genes of *Moraxella lacunata*. J. Bacteriol. **172**:4370-4377.
12. Forney, L.J., **C.F. Marrs**, S.L. Bektesh, and J.R. Gilsdorf. 1991. Comparison and analysis of the nucleotide sequences of pilin genes from *Haemophilus influenzae* type b strains Eagan and M43. Infect. Immun. **59**:1991-1996.
13. Rozsa, F.W., and **C.F. Marrs**. 1991. Interesting sequence differences between the pilin gene inversion regions of *Moraxella lacunata* ATCC 17956 and *Moraxella bovis* Epp63. J. Bacteriol. **173**:4000-4006.
14. Tonjum, T., **C.F. Marrs**, F.W. Rozsa, and K. Bovre. 1991. The type 4 pilin of *Moraxella nonliquefaciens* exhibits unique similarities with the pilins of *Neisseria gonorrhoeae* and *Dichelobacter (Bacteroides) nodosus*. J. Gen. Microbiol. **137**:2483-2490.
15. Patel, P., **C.F. Marrs**, J.S. Mattick, W.W. Ruehl, R.K. Taylor and M. Koomey. 1991. Shared antigenicity and immunogenicity of type 4 pilins expressed by *Pseudomonas aeruginosa*, *Moraxella bovis*, *Neisseria gonorrhoeae*, *Dichelobacter nodosus*, and *Vibrio cholerae*. Infect. Immun. **59**:4674-4676.

16. Forney, L.J., J.R. Gilsdorf, **C.F. Marrs**, K. McCrea, and S. Bektesh. 1992. Comparison of the alpha-pilins of *Haemophilus influenzae* type b strains Eagan (p⁺), M43 (+), and 770235b^{0f+}. *J. Infect. Dis.* **165(suppl 1)**:S106-S107.
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93. Jolliet, O., P. Adriaens, J. Eisenberg, B. Foxman, K. Hayes, J. LiPuma, N. Love, C.F. Marrs, M. Milbrath, C. Picioreanu, L. Raskin, R. Riolo, C.P. Simon, B.F. Smets, M.L. Wilson, and C. Xi. "Spread of antibiotic resistance in water environments and impacts on human health." Presented at the Graham Environmental Sustainability Institute symposium on Water, Health, + the Environment: Establishing the Research Agenda, Ann Arbor, Michigan, March 26-27, 2008.