

Curriculum Vitae **(August, 2018)**

MICHAEL WILLIAM GRAY

b. July 18, 1943; Medicine Hat, Alberta

Canadian citizen

m. Jean Dorothy Gillis; daughters Jennifer Lynn and Meghan Ellen

Professor Emeritus,

Department of Biochemistry and Molecular Biology,

Dalhousie University,

Halifax, Nova Scotia B3H 4R2.

Departmental Website: <http://www.biochem.dal.ca/faculty-staff/faculty/gray.php>

Google Scholar: <https://scholar.google.ca/citations?user=0ypemWUAAAAJ&hl=en&oi=ao>

EDUCATION

Undergraduate

- B.Sc. (Honors) in Biochemistry, University of Alberta, Edmonton; 1964; graduated *magna cum laude*

Graduate

- Ph.D. in Biochemistry, University of Alberta, Edmonton, 1968
- specialization in the biochemistry of nucleic acids
- thesis: *5-Carboxymethyluridine, a Novel Nucleoside Derived from Yeast and Wheat Embryo Transfer RNA* (B.G. Lane, supervisor)

Post-Doctoral

- National Research Council of Canada Fellow in radiobiology research, 1968-70, Department of Radiology, Stanford University School of Medicine
- Research (under K.C. Smith) concerned with elucidation of chemical nature of lesions produced in *E. coli* DNA by ultraviolet radiation, and of enzymatic mechanisms for repair of such lesions

ACADEMIC APPOINTMENTS

- Assistant Professor, Department of Biochemistry, Dalhousie University, July 1, 1970
- Permanent tenure, July 1, 1972
- Promotion to Associate Professor, Jan. 1, 1977
- Professeur Invité, Université de Paris-Sud, Centre d'Orsay, Biologie Moléculaire Végétale, Feb., 1983
- Promotion to Full Professor, July 1, 1983
- Visiting Professor (Genetics Program), Duke University, Durham, North Carolina, Sept. 1994-Aug. 1995
- Head, Department of Biochemistry and Molecular Biology (July 1, 2004-June 30, 2007)
- Professor Emeritus (January 1, 2009)

SABBATICAL LEAVES

- July 1, 1984-June 30, 1985: laboratory of D.A. Clayton, Department of Pathology, Stanford University School of Medicine, Stanford, California
- July 1, 1994-June 30, 1995: laboratory of J.E. Boynton (Botany) and N.W. Gillham (Zoology), Developmental, Cell and Molecular Biology Group, Duke University, Durham, North Carolina

AWARDS AND HONOURS

- Province of Alberta Scholarships (1960, 1961, 1963) and Grant (1962)
- University of Alberta First Class Standing Prizes (1961, 1964)
- University of Alberta Honor Prize (1963)
- Bursary, National Research Council of Canada (1964-65)
- Graduate Teaching Assistsanceships, Department of Biochemistry (1965-66, 1966-67)
- Dissertation Fellowship, University of Alberta (1967-68)
- Postdoctoral Fellowship, Medical Research Council of Canada (1968) (declined)
- Postdoctoral Fellowship, National Research Council of Canada (1968, 1969)
- Scholarship, Medical Research Council of Canada (1973-78)
- Merit Awards (Full), Dalhousie University (1978, 1981)
- APICS/Fraser Medal, Atlantic Provinces Council on the Sciences (1982)
- Visiting Scientist Award, Medical Research Council of Canada (1984-85)
- Sabbatical Leave Research Grant, Dalhousie University (1984-85)
- Max Forman Research Prize (Senior), Dalhousie Medical Research Foundation (1986)
- Fellowship, Evolutionary Biology Program, Canadian Institute for Advanced Research (1987-2007) (named Confederation Fellow, Nov. 25, 1987)
- Boehringer Mannheim Canada Prize, Canadian Biochemical Society (1987)
- Award for Travel to the 14th IUB Congress, American Society for Biochemistry and Molecular Biology (1988)
- First Recipient, Award of Merit, Canadian Society for Plant Molecular Biology (1993)
- Sabbatical Leave Research Grant, Dalhousie University (1994-95)
- Elected Fellow, Royal Society of Canada, Academy of Sciences (1996)
- Wellcome Visiting Professorship in the Basic Medical Sciences (1998-99), Burroughs Wellcome Fund
- Canada Research Chair in Genomics and Genome Evolution (2001-2008)
- Professional of Distinction Finalist, 2006 Discovery Awards for Science and Technology, Discovery Centre, Halifax, NS
- Elected Fellow, American Academy of Microbiology (2013)

UNIVERSITY POSITIONS

- Member, Career Review Committee (1980)
- Member, President's Advisory Committee on Appointment to Office of the Dean of Medicine (1982)
- Member, Senate Discipline Committee (1986-94)
- Member, Radiation Safety Committee (1987-94)
- Member, Vice-President's Investigation Committee Re: Oral Biology (1993)
- Member, Search Committee for the Killam Chair in Neuroscience (1997)
- Senate Representative, University Security and Parking Committee (1999-2001)
- Member, Review Committee, Institute for Research in Materials (2007)
- Member, Dalhousie Rhodes Scholarship Selection Committee (2007)
- Member, Scholarly Integrity Policy Committee (2010-11)

FACULTY POSITIONS

- Member, Department of Pediatrics Survey Committee, Faculty of Medicine (1972)
- Chair, Faculty of Medicine Biohazards Committee (1977-78)
- Member, Faculty Council, Faculty of Medicine (1979-82)
- Member, Faculty of Medicine Nominating Committee (1983, 1986)
- Member, *ad hoc* Committee on Central Stores, Faculty of Medicine (1981-84)
- Member, Faculty of Health Professions Tenure and Promotion Committee (1982-83)
- Member, Scientific Advisory Committee, Dalhousie Medical Research Foundation (1986-89)
- Member, Ph.D. Panel, Faculty of Graduate Studies (1990-97)
- Member, Long Term Planning Committee, Faculty of Medicine (1991-92)
- Chair, Review and Search Committee, Associate Deanship, Medical Research Services (1997-98 and 2000)
- Member, Faculty of Medicine Space Committee (2003-07)
- Member, Review and Search Committee, Associate Deanship, Medical Research Services (2004)

COURSES TAUGHT (PRE-RETIREMENT)

- Biochemistry 3400A (Nucleic Acids Biochemistry and Molecular Biology)
- Biochemistry 5401B (The World of RNA)

SOCIETY MEMBERSHIPS

- American Association for the Advancement of Science (AAAS)
- American Society for Biochemistry and Molecular Biology (ASBMB)
- Canadian Society for Molecular BioSciences (CSMB)
- Federation of American Societies for Experimental Biology (FASEB)
- American Society for Microbiology (ASM)

EXTRAMURAL PROFESSIONAL SERVICE

Scientific Societies

- Member, Nominating Committee, Canadian Biochemical Society (1976-77 and 1979-80)
- Treasurer, Local Organizing Committee, 19th Annual Meeting of the Canadian Federation of Biological Societies (CFBS), Dalhousie University, Halifax, Nova Scotia, June 15-18, 1976
- Member, Forming Committee, International Society for Plant Molecular Biology (1982)
- Member, Forming Committee, Canadian Society for Plant Molecular Biology (CSMPB) (1985)
- Vice-President (1986), President (1987) and Past President (1988), CSPMB
- Local Organizer, 5th Annual Meeting of the CSPMB, Dalhousie University, Halifax, Nova Scotia, June 11-13, 1990
- Member, Royal Society of Canada, Committee for the Evaluation of Molecular Biology (1991-94)
- Councilor, Canadian Society for Biochemistry and Molecular Biology (1991-94)

Research Councils and Foundations

- Member, Biotechnology Development Grants Committee, Medical Research Council of Canada (1983-84)
- Member, Biochemistry Grants Committee, Medical Research Council of Canada (1988-92)
- Chair, Peer Review Committee, Canadian Genome Analysis and Technology Program (1992-96)
- Member, MRC Standing Committee on Science & Research (1997-2000)
- Member, College of Reviewers, Canada Research Chairs Program (2001-08)
- Member, Review Panel, Interagency NSF/USDA-CSREES Microbial Genome Sequencing Program (2007)

Journal Editorial Boards

- Member, Editorial Board, **Plant Science** (1983-87)
- Member, Editorial Board, **The FASEB Journal** (1990-96)
- Coordinating Editor (with R.J. Cedergren, Université de Montréal), **FASEB J.** Special Issue (Jan. 1993), **The New Age of RNA**
- Member, Advisory Board, **Journal of Molecular Evolution** (1991-2000)
- Associate Editor, **Plant Molecular Biology** (1995-99)
- Member, Editorial Board, **Molecular Phylogenetics and Evolution** (1999-2001)
- Founding Editorial Board, **IUBMB Life** (1999)
- Editorial Board, **IUBMB Life** (1999-)
- Coordinating Editor (with W.J. Whelan, F. Vella and A. Azzi), **IUBMB Life** Special Issue XIX Congress of the International Union of Biochemistry and Molecular Biology (July 2003)
- Editorial Board, **BMC Evolutionary Biology** (2005-)
- Editorial Advisory Board, **Versita Open Access Books in Biology** (2012-)
- Editorial Advisory Board, **Protist Genomics** (2012-)
- Editorial Board, **Biology Direct** (2013-)
- Coordinating Editor (with Vamsi K. Mootha, Howard Hughes Medical Institute/Massachusetts General Hospital), **IUBMB Life** Special Issue (2018), **Evolutionary Mitochondrial Biology**

Advisory Boards

- Member, Advisory Board, rRNA Database Project (RDP) (1990)
- Member, Advisory Board, National Research Council Institute for Marine Biosciences (1990-1993)
- Member, Interim Board of Directors, Genome Canada (1999-2000)
- Chair, Science and Industry Advisory Committee (SIAC), Genome Canada (2000-2003)
- Member, Science and Engineering Advisory Council (SEAC), Alberta Ingenuity Fund (2001- 2009)
- Member, NHGRI Comparative Genome Evolution Working Group (National Human Genome Research Institute) (2005-2007)
- Chair, Advisory Committee, CIFAR Program in Integrated Microbial Diversity (2007-2017)
- External Examiner, Medical Science Course, Faculty of Medicine and Health Sciences, United Arab Emirates University, Al Ain (June 2008)

Conference Organization

- Chairman, Session IX, *Mitochondrial Genome Organization and Expression*, N.A.T.O. Advanced Studies Institute, F.E.B.S. Advanced Course on Genome Organization and Expression in Plants, University of Edinburgh, Edinburgh, Scotland, July 11-21, 1979
- Co-Organizer (with W.F. Doolittle), *The Evolution of the Eukaryotic Genome and Its Components*, Dalhousie University, Halifax, Nova Scotia, July 12-15, 1981
- Chairman, Symposium on *Plant Molecular Biology*, 29th Annual Meeting of the CFBS, Guelph, Ontario, June 16-20, 1986
- Chairman, Symposium on *Chloroplasts: Nuclear and Chloroplast Genomes*, 4th International Congress of Cell Biology, Montreal, Quebec, Aug. 14-19, 1988
- Organizer, Symposium on *Ribosomal RNA: Structure, Function and Evolution*, 33rd Annual Meeting of the CFBS, Dalhousie University, June 14-16, 1990
- Organizer, Symposium on *Origin and Evolution of Mitochondrial and Plastid Genomes*, 4th International Congress of Systematic and Evolutionary Biology, University of Maryland, July 1-7, 1990
- Member, International Board of Advisors, 3rd International Congress of Plant Molecular Biology, Tucson, Arizona, Oct. 6-11, 1991
- Chairman, Session on *Mitochondria: Gene Organization*, 3rd International Congress of Plant Molecular Biology, Tucson, Arizona, Oct. 6-11, 1991
- Organizer, Boehringer-Mannheim Graduate Student Competition, 35th Annual Meeting of the CFBS, Victoria, British Columbia, June 18 (1992)
- Chairman, Session on *Nuclear Encoded Mitochondrial Proteins*, HFSP-Workshop on *RNA Editing in Plant Mitochondria and Chloroplasts - Comparison with RNA Editing Processes in Trypanosomes, Physarum and Mammalia*, Berlin, Germany, Sept. 15-20, 1992
- Co-Organizer (with N. Sando and H. Fukuhara) and Chairman (with J. H. Weil), Symposium on *Organization of Organellar Genome*, XV International Botanical Congress, Yokohama, Japan, Aug. 28-Sept. 3, 1993
- Co-Organizer (with B. Bass) and Chairman (Part B), Sessions on *RNA Editing*, EMBO-CNRS Workshop on *Nucleotide Modification and Base Conversion of RNA*, Aussois, France, May 4-8, 1994
- Co-Organizer (with N. Martin), Round Table Discussion on *Modification versus Editing: Differences and Analogies?* EMBO-CNRS Workshop on *Nucleotide Modification and Base Conversion of RNA*, Aussois, France, May 4-8, 1994
- Chairman, *Endosymbiosis Session 1*, Tenth Biennial Meeting of the ISEP, Dalhousie University, Halifax, Nova Scotia, Aug. 4-10, 1994
- Chairman (with K. Inoue), *Exon III: RNA Processing*, 20th Taniguchi Symposium (Biophysics Division) on *Tracing Biological Evolution in Protein and Gene Structures*, Nagoya, Japan, Oct. 30-Nov. 5, 1994
- Member, Scientific Advisory Committee, *Frontiers in Translation* (International Conference on the *Structure and Function of the Ribosome*), Victoria, B.C., May 20-25, 1995
- Member, Organizing Committee, 16th International tRNA Workshop, University of Wisconsin-Madison, May 27-June 1, 1995
- Co-Organizer (with C.G. Kurland, R. Garrett, P. Forterre and S. Andersson), EMBO Workshop on *Molecular Evolution of Archaeal, Bacterial and Organellar Genomes*, Bålsta, Sweden, Oct. 6-9, 1995
- Member, Canadian Program Committee, 6th Congress of the International Society for Plant Molecular Biology, Québec, Québec, June 18-24 (2000)

- Member, Scientific Program Committee and Chair, Symposium on *Lower Plants and Prokaryotes*, 6th International Congress of Plant Molecular Biology, Québec, Canada, June 18-24, 2000
- Member, Advisory Board, EMBO Workshop on *Origins of Cells and Organelles*, Lund, Sweden, Sept. 8-11, 2000
- Co-Vice-Chair and Session Chair (*tRNA Editing*), Gordon Research Conference on *RNA Editing*, Ventura, California, Jan. 21-26, 2001
- Member, Program Committee and Chair, The CIAR Symposium on *Comparative and Evolutionary Genomics*, 44th Annual Meeting of the Canadian Society for Biochemistry and Molecular & Cell Biology, Alliston, Ontario, May 31-June 3, 2001
- Co-Chair, Gordon Research Conference on *RNA Editing*, Ventura, California, Jan. 19-24, 2003
- Discussion Leader, Session on *Diversity and Evolution of Mechanisms for Editing and Modification*, Gordon Research Conference on *RNA Editing*, Ventura, California, Jan. 23-28, 2005
- Chair, Plenary Session 5 (*Eukaryotic Microbes*), International Conference on Microbial Genomes, Halifax, Nova Scotia, April 13-16, 2005
- Co-Chair, 115th International Titisee Conference (*Evolutionary Mitochondrial Biology: Molecular, Biochemical and Evolutionary Diversity*), Schwarzwaldhotel Titisee, March 29-April 2, 2017

Manuscript Review (from 2011)

Antonie van Leeuwenhoek J. Microbiology Biochemistry
 Biochimie
 Biology Direct
 BioEssays
 BMC Biology
 BMC Evolutionary Biology
 BMC Genomics
 BMC Research Notes
 Cellular and Molecular Life Science
 Current Biology
 Eukaryotic Cell
 Genome Biology and Evolution
 ISME Journal
 IUBMB Life
 Journal of Molecular Evolution
 Mitochondrion
 Molecular Biology and Evolution
 Nature
 New Phytologist
 Nucleic Acids Research
 PLoS Biology
 PLoS ONE
 Proc Natl Acad Sci USA
 RNA
 RNA Biology

Grant Application Review (from 2008)

Alberta Advanced Education and Technology
 Czech Science Foundation
 Knut and Alice Wallenberg Foundation (Sweden)
 Natural Sciences and Engineering Research Council of Canada (NSERC)
 National Science Foundation (NSF) (U.S.A)
 Wellcome Trust (U.K.)

RESEARCH INTERESTS

Structure, function and evolution of ribosomal and transfer RNAs and their genes; transcription, RNA processing and RNA editing in protist mitochondria; structure, function and evolutionary origin of mitochondrial nucleic acids, particularly in protists; mitochondrial and nuclear genomics in protists.

RESEARCH FUNDING

Operating Grants:

- Medical Research Council of Canada/Canadian Institutes of Health Research [MOP-4124, 1970-2009] for research on the project *Structure, Function and Evolution of Mitochondrial Nucleic Acids*. Total funding (1970-2009): \$4,225,740
- Natural Sciences and Engineering Research Council of Canada [OGP0008387, 1982-91] for research on the project *Ribosomal RNA Genes in Pieces: Structure, Expression and Evolution*. Total funding (1982-91): \$264,820
- Medical Research Council of Canada/Canadian Institutes of Health Research [MOP-11212, 1991-2006] for research on the project *Ribosomal RNA Structure, Biogenesis and Evolution: Studies of the Eukaryotic rRNA Processing and Modification Machinery*. Total funding (1991-2006): \$1,247,918

Special Project Grants:

- Medical Research Council of Canada [SP-34/SP-14226, 1992-2002; B.F. Lang (PI), with C. Lemieux and M. Turmel], in support of *The Organelle Genome Megasequencing Program*. Total funding (1992-2002): \$2,995,196
- Canadian Genome Analysis and Technology Program [GO-12323; B.F. Lang (PI), with R. Cedergren, C. Lemieux and M. Turmel]. Awarded \$233,726 for the *Organelle Genome Megasequencing Project* (1993-96)
- Canadian Genome Analysis and Technology Program [GO-12984; B.F. Lang (PI), with G. Burger]. Awarded \$388,648 for the *Organelle Genome Database Project* (1995-98)
- Canadian Institutes of Health Research, Genomics Research Program [GOP-41542; G. Burger (PI), with B.F. Lang]. Awarded \$136,000 (including \$16,000 for equipment) for Pilot Project, *Genomics of Primitive Eukaryotes* (2000-02)
- Community Sequencing Program, U.S. DOE Joint Genome Institute: J.M. Archibald (PI), with P.J. Keeling, G. McFadden. Sequencing costs for two algal genomes in the project *Impact of Secondary Endosymbiosis on Eukaryotic Genome Evolution and Cell Biology: a Cryptomonad and Chlorarachniophyte Nuclear Genome*
- U.S. National Human Genome Research Institute: with G. Burger, P. Holland, N. King, B.F. Lang, A. Roger, I. Ruiz-Trillo. Sequencing costs for ten opisthokont/fungal genomes in the project *Animals and Fungi: Common Origin, but Independent Approaches to Multicellularity*
- Natural Sciences and Engineering Research Council of Canada, Special Research Opportunity Program: Co-PI with J.M. Archibald (PI). Awarded \$219,000 for research project *Impact of Secondary Endosymbiosis on Eukaryotic Genome Evolution* (2008-10)

Contracts:

- Genome Canada [with A.J. Roger, R.W. Lee, D.G. Durnford, B.F. Lang, G. Burger, R.E. Pearlman, G.B. Golding, P.J. Keeling]. Awarded \$2,902,818 for the *Protist EST Program* (2001-2007) [\$1,746,253 through Genome Atlantic; \$1,156,565 through Génome Québec]

Equipment:

- MRC, 1976-77, \$19,500, to purchase a multichannel liquid scintillation counter (with R.A. Singer, W.F. Doolittle, S.D. Wainwright, C.W. Helleiner, C. Mezei, M.H. Tan, C.B. Lazier, & F.B. Palmer)
- MRC, 1981-82, \$27,010, for purchase of Beckman DU-8 uv-visible computing spectrophotometer and accessories (with W.F. Doolittle & S.J. Patrick)
- MRC, 1984-85, \$100,000, for purchase of centrifuge equipment (with R.W. Chambers, W.F. Doolittle, C.B. Lazier, C. Mezei & R.G. Fenwick)
- MRC, 1986-87, \$26,150, for purchase of liquid scintillation counter (with C.B. Lazier)
- DMRF, 1990, \$12,000, partial funding for purchase of DNA synthesizer (with W.F. Doolittle & P.X.-Q. Liu)
- DMRF, 1991, \$8,578, partial funding for purchase of Beckman model DU-65 uv-visible spectrophotometer
- Sun Microsystems, 1992, \$62,780, academic equipment grant for purchase of computer hardware and software (with B.F. Lang and G. Burger)
- DMRF, 1994, \$20,000, for purchase of IEC refrigerated preparative centrifuge
- MRC, 1996, \$98,745, for purchase of multi-user molecular phosphoimager (with R.W. Currie, T. Hagg, M. Dobson, W.F. Doolittle, F.B. Palmer, H.-S. Ro, R. Singer, C. Too, H. Robertson, N. Tatton, K. Renton, P. Hoffman, G. Johnston & P. Murphy)
- Sun Microsystems, 1999, \$175,305, academic equipment grant for purchase of computer hardware and software (with B.F. Lang and G. Burger)
- CFI New Opportunities Fund, 1999, \$100,000 to support establishment of a new laboratory for comparative genomics [with A. Roger (PI) and W.F. Doolittle]
- CFI Canada Research Chairs Infrastructure Fund, 2001, \$60,691 to purchase instrumentation to establish an enhanced capacity for RNA and protein biochemistry to complement a genomics research program
- CIHR Multi-user Equipment & Maintenance Grant, 2003, \$469,434 to purchase a multi-user proteomics workstation [with D. M. Byers (PI), S.L. Bearne, R. Duncan, R. Garduno, P.S. Hoffman, T.B. Issekutz, C.R. McMaster and N.D. Ridgway]
- CIHR Multi-user Equipment & Maintenance Grant, 2004, \$140,183 to purchase a multi-user preparative ultracentrifuge and rotors for biochemical research [with R. Macleod (PI), S.L. Bearne, M. Dobson and K.-L. Too]

Personnel Support:

- MRC Biotechnology Training Grant (with R.W. Chambers, W.F. Doolittle, R.G. Fenwick, C.B. Lazier, R.A. Singer & G.C. Johnston), 1983-88. (Support for five research trainees/yr)

GRADUATE THESES SUPERVISED**Ph.D.**

R. Scott Cunningham, 1977

- *A Comparative Study of Wheat Mitochondrial and Cytosol Ribosomal RNA*
- APICS Summer Research Scholarships (1971,1972)
- Killam Scholarship (1974-77)

Linda J. Bonen, 1980

- *Novel Features of Wheat Mitochondrial DNA and its Ribosomal RNA Genes*
- Killam Scholarship (1977-80)
- MRC Studentship (1977-80)

- First Recipient of The Max Forman Research Prize (Junior), Dalhousie Medical Research Foundation (1981)
- Murray N. Schnare, 1984
- *Ribosomal RNA Structure and Evolution Revealed by Nucleotide Sequence Analysis*
- Poppo H. Boer, 1988
- *Structure and Expression of Chlamydomonas Mitochondrial Genes: Scrambled Ribosomal RNA Gene Pieces*
 - Killam Scholarship (1985-86) (declined)
 - The Max Forman Research Prize (Junior),
 - Dalhousie Medical Research Foundation (1987)
- Paul B.M. Joyce, 1989
- *Structure, Organization and Expression of Mitochondrial Transfer RNA Genes in Wheat (Triticum aestivum)*
 - Studentship, MRC Biotechnology Training Grant (1984-85)
 - MRC Studentship (1985-88)
 - Walter C. Sumner Memorial Fellowship (1988-89)
- James C. Collings, 1991
- *Genomic Organization of the Nuclear Ribosomal RNA Genes and Primary Sequence Analysis of the Ribosomal Spacer DNA in the Flagellate Protoctist, Crithidia fasciculata*
- Kim M. Lonergan, 1993
- *The Ribosomal RNA Gene Region of Acanthamoeba castellanii Mitochondrial DNA: Organization, Mode of Expression and Evolution*
 - Walter C. Sumner Memorial Fellowship (1990-92)
 - First Recipient, Patrick Prize in Biochemistry (1994)
- Spencer J. Greenwood, 1994
- *Ribosomal RNA Processing in Euglena gracilis*
 - Walter C. Sumner Memorial Fellowship (1991-93)
 - President's Graduate Teaching Assistant Award (1994)
- Kathleen Glover, 1995
- *The Genetic Origins of Transfer RNAs in Wheat (Triticum aestivum) Mitochondria*
 - Walter C. Sumner Memorial Fellowship (1992-94)
- David Price, 1998
- *Editing of Transfer RNAs in the Mitochondria of Acanthamoeba castellanii*
 - NSERC 1967 Science and Engineering Scholarship (1993-97)
 - Graduate Entrance Scholarship, Faculty of Medicine, Dalhousie University (1993)
 - Izaak Walton Killam Memorial Scholarship, Dalhousie University (1993-96)
 - Walter C. Sumner Memorial Fellowship (1997-98)
- John Norman, 2000
- *Mitochondrial Genome Organization, Expression and Evolution in the Dinoflagellate, Cryptocodinium cohnii*
 - MRC Studentship (1995-98)
- Charles Bullerwell, 2005
- *tRNA Editing and Characterization of Novel Small RNAs in Protist Mitochondria*
 - Studentship, Nova Scotia Health Research Foundation (2003-2005)
 - Doug Hogue Award (2003-2004)
 - Patrick Prize in Biochemistry (2005)
- Timothy Shutt, 2006
- *Origins and Evolution of Mitochondrial Transcription and Replication Machinery*
 - -Patrick Prize in Biochemistry (2007)

Michael Charette, 2007

- *Studies on the Structure, Expression, Genome Organization, and Evolution of U3 snoRNA Genes in Euglena gracilis*
- MRC Studentship (1997-2001)
- Governor's Award, Dalhousie University (2004)

Ryan Gawryluk, 2011

- *Comparative Proteomics: Studies on the Composition and Evolution of the Mitochondrial Proteome in Eukaryotic Microbes*
- NSERC PGSM (2005-07)
- Killam Predoctoral Scholarship (2005-11)
- Dalhousie University President's Award (2007-08)
- NSERC CGSD (2008-10)
- Patrick Prize in Biochemistry (2011)

M.Sc.

Thomas J. Digby, 1989 (jointly supervised with C.B. Lazier)

- *Studies on Structure and Transcription of Rainbow Trout Mitochondrial DNA*
- Studentship, MRC Biotechnology Training Grant (1987-89)

Timothy Chipman, 1998

- *Studies on Mitochondrial DNA in the Charophycean Alga, Klebsormidium flaccidum*
- NSERC Postgraduate Scholarship (1994-95)
- Graduate Entrance Scholarship, Faculty of Medicine, Dalhousie University (1994)
- Killam Scholarship, Dalhousie University (1994)

Elinor T. Schindel, 2004

- *Editing of Mitochondrial tRNAs in Polysphondylium pallidum*

POST-DOCTORAL FELLOWS

David F. Spencer (1978-81)

Linda J. Bonen (1983-85)

- Fellowship, Dalhousie Medical Research Foundation

Taisto Y.K. Heinonen (1985-88)

- NSERC Postdoctoral Fellowship (1985-87)

Pamela Hanic-Joyce (1986-89)

- MRC Postdoctoral Fellowship (1986-89)

Michael B. Coulthart (1987-91)

- Fellowship, MRC Biotechnology Training Grant (1987-89)
- Grant, Research Development Fund, Faculty of Graduate Studies, Dalhousie University (\$900.00)

Patrick S. Covello (1988-91)

- Fellowship, MRC Biotechnology Training Grant (1988-89)
- Fellowship, Dalhousie Medical Research Foundation (Aug. 1-Dec. 30, 1990)
- The Max Forman Research Prize (Junior), Dalhousie Medical Research Foundation (1989)
- Grant, Research Development Fund, Faculty of Graduate Studies, Dalhousie University (\$1,000.00)

Sandra L. Baldauf (1991-93)

- Fellowship in Molecular Studies of Evolution, Alfred P. Sloan Foundation

Tatsuya Ikeda (1992-98)

- Grant, Research Development Fund, Faculty of Graduate Studies, Dalhousie University (\$1,000.00)

Johan Edqvist (1994-96)

Yoh-ichi Watanabe (1996-2000)

Russell Watkins (2001-06)

Amanda Lohan (1999-2007)

Anthony Russell (2000-07)

- Fellowship, Nova Scotia Health Research Foundation (2000-02)

INVITED LECTURES (from 2000)

2000

- Graduate Interdisciplinary Program in Genetics, University of Arizona, Tucson, AZ (Feb. 23)
Mitochondrial Genomics
- Department of Biological Chemistry, Johns Hopkins University School of Medicine, Baltimore, MD (Mar. 28)
Transfer RNA Editing in Acanthamoeba Mitochondria: Mechanism and Evolution
- Department of Genetics, Washington University School of Medicine, St. Louis, MO (Mar. 30)
Serendipity in the Euglenozoa: Small Nuclear and Nucleolar RNAs
- Center for the Study of Comparative Functional Genomics, The University at Albany, State University of New York, Albany, NY (Apr. 11)
A Genomics Perspective on Mitochondrial Evolution

2001

- Department of Physics, Dalhousie University, Halifax, NS (Jan. 11)
Mitochondrial Evolution

2002

- Department of Biology, Mount Allison University, Sackville, NB (Apr. 2)
Origin and Evolution of Mitochondria: a Genomics Approach
- Departments of Biology and Molecular Ecology, Lund University, Lund, Sweden (Dec. 3)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales

2003

- School of Biological Sciences, University of Texas, Austin, TX (Mar. 17)
The Mitochondrial Genome: Common Evolutionary Origin, Extraordinarily Variable Structure

2004

- Department of Biochemistry and Molecular Biology, University of Miami, Miami, FL (Apr. 16)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales
- B.C. Cancer Research Centre, B.C. Cancer Agency, Vancouver, BC (Sept. 20)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales

2005

- Department of Botany, University of British Columbia, Vancouver, BC (Sept. 20)
Mitochondrial Evolution: Going Off in All Directions

2006

- Marine Biological Laboratory, Woods Hole, MA (March 24)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales
- Département de biochimie, Université de Sherbrooke, Sherbrooke, QC (March 29)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales

2009

- Ohio State University RNA Group, Columbus, OH (May 22)
Spectacular and Bizarre: RNA Editing and its Evolution
- Department of Biology, University of New Brunswick, Fredericton, NB (November 13)
Two Views of Mitochondrial Evolution: Genomics vs. Proteomics

2013

- BTI Distinguished Lecture, Boyce Thompson Institute for Plant Biology, Ithaca, NY (April 3-4)
Mitochondrial Evolution: Genome vs. Proteome
Spectacular and Bizarre: RNA Editing and its Evolution
- Department of Biochemistry and Molecular Biology, Dalhousie University, Halifax, NS
The Pre-endosymbiont Hypothesis: an Updated Perspective on the Origin and Evolution of Mitochondria.

2015

- MRC Mitochondrial Biology Unit, Cambridge Biomedical Campus, Cambridge, U.K. (March 27)
Mitochondrial Evolution: Genome vs. Proteome

2018

- *Science Sundays*, Ohio State University, Columbus, OH (November 18)
How Did the Powerhouse of the Cell Originate?

PUBLICATIONS

I. Original Research Contributions

1. COLLIER, H.B. AND GRAY, M.W. (1965) Enzyme inhibition by derivatives of phenothiazine. VII. Inhibition of glucose-6-phosphate dehydrogenase activity of rabbit erythrocytes. *Can. J. Biochem.* **43**, 105-110.
2. HUDSON, L., GRAY, M. AND LANE, B.G. (1965) The alkali-stable dinucleotide sequences and the chain termini in soluble ribonucleates from wheat germ. *Biochemistry* **4**, 2009-2016.
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II. Invited Review Articles, Commentaries, Compendia

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(Arthur M. Sackler Colloquium, *Symbioses Becoming Permanent: The Origins and Evolutionary Trajectories of Organelles*)
52. **GRAY, M.W.** (2017) Lynn Margulis and the endosymbiont hypothesis: 50 years later. *Mol. Biol. Cell*, **28**, 1285-1287.

III. Sequence Reports, Letters to the Editor, Encyclopedia Articles

1. BOER, P.H. AND **GRAY, M.W.** (1986) Nucleotide sequence of a protein coding region in *Chlamydomonas reinhardtii* mitochondrial DNA. *Nucleic Acids Res.* **14**, 7506-7507.
2. BONEN, L., BOER, P.H., MCINTOSH, J.E. AND **GRAY, M.W.** (1987) Nucleotide sequence of the wheat mitochondrial gene for subunit I of cytochrome oxidase. *Nucleic Acids Res.* **15**, 6734.
3. **GRAY, M.W.** (1987) The origin of mitochondria: a problem in evolutionary biology. *Vox Meda* **14**, 24-27.
4. JOYCE, P.B.M. AND **GRAY, M.W.** (1988) Nucleotide sequence of a wheat mitochondrial glutamine tRNA gene. *Nucleic Acids Res.* **16**, 1210.
5. BOER, P.H. AND **GRAY, M.W.** (1989) Nucleotide sequence of a region encoding subunit 6 of NADH dehydrogenase (ND6) and tRNA^{Trp} in *Chlamydomonas reinhardtii* mitochondrial DNA. *Nucleic Acids Res.* **17**, 3993.
6. JOYCE, P.B.M. AND **GRAY, M.W.** (1989) Nucleotide sequence of a wheat mitochondrial lysine tRNA gene. *Biochim. Biophys. Acta* **1008**, 355-356.

7. JOYCE, P.B.M. AND **GRAY, M.W.** (1989) Nucleotide sequence of a second glutamine tRNA gene in wheat mitochondrial DNA. ***Nucleic Acids Res.* 17**, 4885.
8. **GRAY, M.W.** (1989) CpG polymorphisms and haemophilia B. ***Lancet* ii**, 502-503.
9. DOUGLAS, S.E. AND **GRAY, M.W.** (1991) Plastid origins. ***Nature* 352**, 290.
10. SCHNARE, M.N. AND **GRAY, M.W.** (1992) A new 3'-terminus for *Xenopus laevis* 28S ribosomal RNA. ***Nucleic Acids Res.* 20**, 608.
11. SCHNARE, M.N., YEPIZ-PLASCENCIA, G.M., COPERTINO, D.W., HALLICK, R.B. AND **GRAY, M.W.** (1992) 5'- and 3'-Terminal sequences of the chloroplast 16S and 23S ribosomal RNAs of *Euglena gracilis*. ***Nucleic Acids Res.* 20**, 1421.
12. **GRAY, M.W.** (1992) The *Organelle Genome Sequencing Project*: megabases in Montréal. ***Plant Mol. Biol. Rep.* 10**, 100-102.
13. **GRAY, M.W.** AND CEDERGREN, R. (1993) The new age of RNA. ***FASEB J.* 7**, 4-6. (Editors' Overview for Special Issue, ***The New Age of RNA***)
14. LONERGAN, K.M. AND **GRAY, M.W.** (1993) Predicted editing of additional transfer RNAs in *Acanthamoeba castellanii* mitochondria. ***Nucleic Acids Res.* 21**, 4402.
15. **GRAY, M.W.** (1993) RNA editing in mitochondria and chloroplasts. ***Rice Biotech. Quart.* 16**, RBQ29.
16. **GRAY, M.W.** (1994) DNA and heredity: 1944 paper caused little hype. ***Dalhousie News* 24**, 12.
17. **GRAY, M.W.** (1998) Research funding in Canada. ***Lancet* 351**, 759.
18. **GRAY, M.W.** (2001) RNA editing: evolutionary implications. In ***Encyclopedia of Life Sciences*** (Robertson, S., ed.), Macmillan Reference Limited, London, U.K.
19. **GRAY, M.W.** (2001) Mitochondria. In ***Encyclopedia of Genetics*** (Brenner, S. and Miller, J., eds.), Academic Press, San Diego, CA, pp. 1215-1217.
20. **GRAY, M.W.** (2001) Mitochondrial DNA (mtDNA). In ***Encyclopedia of Genetics*** (Brenner, S. and Miller, J., eds.), Academic Press, San Diego, CA, pp. 1219-1220.
21. **GRAY, M.W.** (2001) Mitochondrial genome. In ***Encyclopedia of Genetics*** (Brenner, S. and Miller, J., eds.), Academic Press, San Diego, CA, pp. 1220-1222.
22. **GRAY, M.W.** (2001) Mitochondrial mutants. In ***Encyclopedia of Genetics*** (Brenner, S. and Miller, J., eds.), Academic Press, San Diego, CA, pp. 1222-1224.
23. **GRAY, M.W.** (2001) Organelles. In ***Encyclopedia of Genetics*** (Brenner, S. and Miller, J., eds.), Academic Press, San Diego, CA, pp. 1377-1379.
24. **GRAY, M.W.** (2002) Cell evolution. In ***Encyclopedia of Evolution*** (Pagel, M., ed.-in-chief), Vol. 1, Oxford University Press, New York, NY, pp. 137-142.
25. **GRAY, M.W.** (2002) Endosymbiont theory. In ***Encyclopedia of Evolution*** (Pagel, M., ed.-in-chief), Vol. 1, Oxford University Press, New York, NY, pp. 229-303.
26. **GRAY, M.W.** (2004) Genome structure and gene content in plant and protist mitochondrial DNAs. In ***The Encyclopedia of Plant & Crop Science*** (Goodman, R.M., ed.), Marcel Dekker, Inc., New York, NY, pp. 520-523.
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28. **GRAY, M.W.** (2005/May 3) RNA editing: evolutionary implications. In ***Encyclopedia of Life Sciences***, John Wiley & Sons Ltd., Chichester.
29. **GRAY, M.W.** AND BEYER, A.L (2011) Ribonucleic acid (RNA). ***McGraw Hill Encyclopedia of Science & Technology, 11th edition***, in press
30. **GRAY, M.W.** (2012) Organelles. In ***Brenner's Online Encyclopedia of Genetics 2E***, S. Maloy and K. Hughes (eds.), Elsevier, in press
31. **GRAY, M.W.** (2012) Mitochondria. In ***Brenner's Online Encyclopedia of Genetics 2E***, S. Maloy and K. Hughes (eds.), Elsevier, in press
32. **GRAY, M.W.** (2012) Mitochondrial DNA. In ***Brenner's Online Encyclopedia of Genetics 2E***, S. Maloy and K. Hughes (eds.), Elsevier, in press

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34. **GRAY, M.W.** (2012) Mitochondrial mutants. In *Brenner's Online Encyclopedia of Genetics 2E*, S. Maloy and K. Hughes (eds.), Elsevier, in press
35. **Gray, M.** (2013) Mitochondrial genomes. In: Bell, E., Bond, J., Klinman, J., Masters, B. and Wells, R. (eds.) *Molecular Life Sciences: An Encyclopedic Reference*: SpringerReference (www.springerreference.com). Springer-Verlag Berlin Heidelberg, 2013. DOI: 10.1007/SpringerReference_333640 2014-03-20 13:49:09 UTC. Overview Essay for Subsection 6a (Mitochondrial Genomes), Section 4 (Genes & Genomes: Structure)
36. **GRAY, M.W.** (June 2013) RNA editing: evolutionary implications. In *eLS 2013*, John Wiley & Sons, Ltd., Chichester. DOI: 10.1002/9780470015902.a0003069.pub3
37. GAWRYLUK, R.M.R., CHISHOLM, K.A., PINTO, D.M. AND **GRAY, M.W.** (2014) Data showing the compositional complexity of the mitochondrial proteome of a unicellular eukaryote (*Acanthamoeba castellanii*, supergroup Amoebozoa). *Data in Brief* **1**, 12-14.

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GRAY, M.W. AND MOOTHA, V.K. (2018) Evolutionary mitochondrial biology in Titisee. (2018) *IUBMB Life* Special Issue, *Evolutionary Mitochondrial Biology*

GRAY, M.W. (2019) Origin and evolution of mitochondria. *eLS*

IV. Invited Book Chapters

1. CUNNINGHAM, R.S., **GRAY, M.W.**, DOOLITTLE, W.F. AND BONEN, L. (1977) The prokaryotic nature of wheat embryo mitochondrial 18S ribosomal RNA. In *Acides Nucléiques et Synthèse des Protéines Chez les Végétaux* (Bogorad, L. and Weil, J.H., eds.), pp. 243-248, Centre National de la Recherche Scientifique, Paris.
2. **GRAY, M.W.**, BONEN, L., FALCONET, D., HUH, T.Y., SCHNARE, M.N. AND SPENCER, D.F. (1982) The mitochondrial ribosomal RNAs of *Triticum aestivum* (wheat): sequence analysis and gene organization. In *Mitochondrial Genes* (Slonimski, P., Borst, P. and Attardi, G., eds.), pp. 483-488, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
3. **GRAY, M.W.**, HUH, T.Y., SCHNARE, M.N., SPENCER, D.F. AND FALCONET, D. (1983) Organization and evolution of ribosomal RNA genes in wheat mitochondria. In *Structure and Function of Plant Genomes* (Ciferri, O. and Dure, L., eds.), pp. 373-380, Plenum Press, New York.
4. SPENCER, D.F., WILLIAMSON, S., SCHNARE, M.N., **GRAY, M.W.**, DOOLITTLE, W.F. AND BONEN, L. (1983) The endosymbiotic origin of organelles: compelling support from ribosomal RNA sequence data. In *Endocytobiology II. Intracellular Space as Oligogenetic System* (Schenk, H.E.A. and Schwemmler, W., eds.), pp. 871-879, Walter de Gruyter, Berlin.
5. **GRAY, M.W.**, HUH, T.Y., SCHNARE, M.N., SPENCER, D.F. AND FALCONET, D. (1985) Organization and evolution of ribosomal RNA genes in wheat mitochondria. In *The Origin of Eukaryotic Cells* (Dyer, B.D. and Ober, R., eds.), pp. 145-152, Van Nostrand Reinhold, Florence, Kentucky. (Selected for reprinting from *Structure and Function of Plant Genomes* (1983)) (Ciferri O, and Dure, L., eds.), pp. 373-380, Plenum Press, New York)
6. **GRAY, M.W.** AND CLAYTON, D.A. (1987) Characterization of a mouse mitochondrial transcription system. In *Transcriptional Control Mechanisms* (Granner, D.K., Rosenfeld, G. and Chang, S., eds.), UCLA Symposium on Molecular and Cellular Biology, New Series, V. 52, pp. 395-404, Alan R. Liss, Inc., New York.
7. SANKOFF, D., ABEL, Y., CEDERGREN, R.J. AND **GRAY, M.W.** (1988) Supercomputing for molecular cladistics. In *Classification and Related Methods of Data Analysis* (Bock, H.H., ed.), pp. 385-394, North-Holland, Amsterdam.
(Proceedings of the First Conference of the International Federation of Classification Societies (IFCS'87), Aachen, F.R.G., June 29-July 7, 1987)

8. **GRAY, M.W.**, BOER, P.H., COLLINGS, J.C., HEINONEN, T.Y.K., SPENCER, D.F. AND SCHNARE, M.N. (1989) Ribosomal RNA genes in pieces. In **Highlights of Modern Biochemistry** (Kotyk, A., Koda, J., Pařes, V. and Kostka, V., eds.), pp. 521-530, VSP International Science Publishers, Zeist.
(Proceedings of the 14th International Congress of Biochemistry, Prague, Czechoslovakia, July 10-15, 1988)
9. **GRAY, M.W.** (1990) The mitochondrial genome and its expression. Chapter 10, in **Plant Physiology, Biochemistry and Molecular Biology** (Dennis, D.T. and Turpin, D.H., eds.), pp. 147-159, Longman Group, Harlow, U.K.
10. **GRAY, M.W.** AND SCHNARE, M.N. (1990) Evolution of the modular structure of ribosomal RNA. Chapter 52, in **The Ribosome: Structure, Function, and Evolution** (Hill, W.E., Dahlberg, A., Garrett, R., Moore, P.B., Schlessinger, D. and Warner, J.R., eds.), pp. 589-597, American Society for Microbiology, Washington, DC.
11. **GRAY, M.W.** (1991) Origin and evolution of plastid genomes and genes. Chapter 11, in **The Molecular Biology of Plastids** (Vol. 7A in **Cell Culture and Somatic Cell Genetics of Plants**) (Bogorad, L. and Vasil, I.K., eds.), pp. 303-330, Academic Press, Inc.
12. SPENCER, D.F., **GRAY, M.W.** AND SCHNARE, M.N. (1992) The isolation of wheat mitochondrial DNA and RNA. In **Seed Analysis** (Vol. 14 in **Modern Methods of Plant Analysis, New Series**) (Linskens, H.F. and Jackson, J.F., eds.), pp. 347-360, Springer-Verlag, Berlin/Heidelberg.
13. **GRAY, M.W.** (1992) Split RNAs and modified nucleosides in ribosome evolution. In **The Origin and Evolution of the Cell** (Hartman, H. and Matsuno, K., eds.), pp. 333-358, World Scientific, Singapore.
(Proceedings of the Conference on the *Origin and Evolution of Prokaryotic and Eukaryotic Cells*, Shimoda, Japan, Apr. 22-25, 1992)
14. **GRAY, M.W.** AND LONERGAN, K.M. (1993) Transfer RNA editing in *Acanthamoeba castellanii* mitochondria. Chapter 1, in **Plant Mitochondria** (Brennicke, A. and Kück, U., eds.), pp. 15-22, VCH Verlagsgesellschaft mbH/VCH Publishers, Weinheim/Cambridge/New York.
15. **GRAY, M.W.** (1995) Mitochondrial evolution. Chapter 20, in **The Molecular Biology of Plant Mitochondria** (Vol. 2 in **Advances in Cellular and Molecular Biology of Plants**) (Levings, C.S. III and Vasil, I.K., eds.), pp. 635-659, Kluwer Academic Publishers, Dordrecht, The Netherlands.
16. **GRAY, M.W.**, GREENWOOD, S.J., SMALLMAN, D.S., SPENCER, D.F. AND SCHNARE, M.N. (1995) Ribosomal RNA in pieces: a modern paradigm of the primordial ribosome. In **Tracing Biological Evolution in Protein and Gene Structures** (Go, M. and Schimmel, P., eds.), pp. 65-76, Elsevier Science B.V., Amsterdam, The Netherlands.
[Also published in the Proceedings of the 20th Taniguchi Symposium, Biophysics Division (1994) (Go, M., ed.), pp. 91-106]
17. **GRAY, M.W.** AND SCHNARE, M.N. (1996) Evolution of rRNA gene organization. Chapter 3, in **Ribosomal RNA: Structure, Evolution, Processing, and Function in Protein Biosynthesis** (R.A. Zimmermann and A.E. Dahlberg, eds.), pp. 49-69, CRC Press, Boca Raton, Florida.
18. **GRAY, M.W.** AND SPENCER, D.F. (1996) Organellar evolution. In **Evolution of Microbial Life** (Society for General Microbiology Symposium 54) (Roberts, D.M., Sharp, P., Alderson, G. and Collins, M., eds.), pp. 109-126, Cambridge University Press, U.K.
(Main Symposium, *Evolution of Microbial Life*, 134th Meeting of the Society for General Microbiology, University of Warwick, U.K., Mar. 26-29, 1996)
19. BONEN, L. AND **GRAY, M.W.** (1997) The mitochondrial genome and its expression. In **Plant Metabolism (Section III: Mitochondrial Metabolism)** (Dennis, D.T., Turpin, D.H., Lefebvre, D. D. and Layzell, D. B., eds.), pp. 166-180, Addison Wesley Longman, Harlow, U.K.
20. PRICE, D.H. AND **GRAY, M.W.** (1998) Editing of transfer RNA. In **Modification and Editing of RNA: The Alteration of RNA Structure and Function** (Grosjean, H. and Benne, R., eds.), pp. 289-305, ASM Press, Washington, D.C.
21. **GRAY, M.W.**, LEMIEUX, C., BURGER, G., LANG, B.F., OTIS, C., PLANTE, I. AND TURMEL, M. (1998) Mitochondrial genome organization and evolution within the green algae and land plants. In **Plant Mitochondria: From Gene to Function** (Møller, I.M., Gardeström, P., Glimelius, K. and Glaser, E., eds.), pp. 1-8, Backhuys Publishers, Leiden, The Netherlands.
22. IKEDA, T.M. AND **GRAY, M.W.** (1998) Biochemical characterization of the wheat mitochondrial transcriptional machinery. In **Plant Mitochondria: From Gene to Function** (Møller, I.M.,

- Gardeström, P., Glimelius, K. and Glaser, E., eds.), pp. 191-194, Backhuys Publishers, Leiden, The Netherlands.
23. **GRAY, M.W.** (2001) Speculations on the origin and evolution of editing. In ***RNA Editing***, Frontiers in Molecular Biology (Bass, B.L., ed.), pp. 160-184, Oxford University Press, Oxford, U.K.
 24. **GRAY, M.W.** (2004) The evolutionary origins of plant organelles. In ***Molecular Biology and Biotechnology of Plant Organelles*** (Daniell, H. and Chase, C., eds.), pp. 15-36, Springer, Dordrecht, The Netherlands.
 25. **GRAY, M.W.** (2005) Contemporary issues in mitochondrial origins and evolution. In ***Microbial Phylogeny and Evolution. Concepts and Controversies***. (Sapp, J., ed.), Oxford University Press, New York, pp. 224-237.
 26. LIN, S., ZHANG, H. AND **GRAY, M.W.** (2008) RNA editing in dinoflagellates and its implications for the evolutionary history of the editing machinery. In ***RNA and DNA Editing: Molecular Mechanisms and Their Integration into Biological Systems*** (Smith, H.C., ed.), Wiley Press, pp. 280-309.
 27. **GRAY, M.W.** AND ARCHIBALD, J.M. (2012) Origins of mitochondria and plastids. In ***Genomics of Chloroplasts and Mitochondria*** (Bock, R. and Knoop, V., eds.), Springer, Dordrecht, pp. 1-30.
 28. DODBELE, S., JACKMAN, J.E., AND **GRAY, M.W.** (2018) Mechanisms and evolution of mitochondrial tRNA 5'-editing. In ***RNA Metabolism in Mitochondria*** (Cruz-Reyes, J. and Gray, M.W., eds.), Vol. 34, *Nucleic Acids and Molecular Biology*, Springer International Publishing AG.

V. Books Edited

CRUZ-REYES, J. AND **GRAY, M.W.** (eds.) (2018) ***RNA Metabolism in Mitochondria***, Vol. 34, *Nucleic Acids and Molecular Biology*, Springer International Publishing AG, part of Springer Nature https://doi.org/10.1007/978-3-319-78190-7_1

VI. Invited Conference Presentations (presenter's name underlined)

1. MACKAY, R.M., SCHNARE, M.N., SPENCER, D.F., GRAY, M.W. AND DOOLITTLE, W.F. (1981) ***Proc. Can. Fed. Biol. Soc.* 24**, 318.
Evolutionary and structural implications of new 5S and 5.8S ribosomal RNA sequences from plants and protists.
(Minisymposium on ***Biochemical Evolution of the Translational Apparatus, 24th Annual Meeting of the Canadian Federation of Biological Societies***, McGill University, Montreal, QC, June 14-19)
2. GRAY, M.W. (1981) ***The Evolution of the Eukaryotic Genome and Its Components***, Dalhousie University, Halifax, NS, July 12-15.
The mitochondrial lineage: an overview.
3. GRAY, M.W. (1982) **N.A.T.O. Advanced Studies Institute, F.E.B.S. Advanced Course on Structure and Function of Plant Genomes**, Porto Portese, Italy, Aug. 23-Sept. 2.
Physical structure and gene organization in higher plant mitochondrial DNA: organization of the ribosomal RNA genes in the mitochondrial genome of wheat.
4. BOER, P.H., BONEN, L., LEE, R.W. AND GRAY, M.W. (1984) **EMBO Workshop on Plant Mitochondrial DNA: Organization, Information Content, Expression**, Melrose, Scotland, May 21-25.
Characterization of the 16K DNA from Chlamydomonas reinhardtii mitochondria.
5. SPENCER, D.F., SCHNARE, M.N. AND GRAY, M.W. (1984) **EMBO Workshop on Plant Mitochondrial DNA: Organization, Information Content, Expression**, Melrose, Scotland, May 21-25.
Ribosomal RNA genes in wheat mitochondrial DNA.
6. GRAY, M.W., BOER, P., BONEN, L., SCHNARE, M.N. AND SPENCER, D.F. (1985) ***Fed. Proc.* 44**, 1051.
Organization and evolution of plant mitochondrial DNA.

- (Minisymposium on **Mitochondrial DNA**, 69th Annual Meeting of Federation of American Societies for Experimental Biology, Anaheim, CA, Apr. 21-26)
7. **BOER, P.H. AND GRAY, M.W.** (1985) **Second International Conference on Genetics and Molecular Biology of Chlamydomonas**, University of California, Santa Cruz, CA, Aug. 11-15. *Expression of the mitochondrial genome of Chlamydomonas reinhardtii.*
 8. **GRAY, M.W.** (1985) **Gordon Research Conference on Origin of Life**, Proctor Academy, Andover, NH, Aug. 19-23. *A polyphyletic origin of mitochondria?*
 9. **BOER, P.H. AND GRAY, M.W.** (1985) **First International Congress of Plant Molecular Biology**, Savannah, GA, Oct. 28-Nov. 2. *Organization and expression of the mitochondrial genome of Chlamydomonas reinhardtii.*
 10. **GRAY, M.W.** (1986) **Annual Meeting of the Genetics Society of Canada**, Université Laval, Québec, QC, June 8-11. *Evolution of organelle ribosomal RNA genes.*
(Symposium on **Genetics of Organelles**)
 11. **LEMIEUX, C., BOULANGER, J., GRAY, M.W., LEE, R.W., LEMIEUX, B. AND TURMEL, M.** (1986) **Annual Meeting of the Genetics Society of Canada**, Université Laval, Québec, QC, June 8-11. *Chloroplast DNA recombination in interspecific hybrids of Chlamydomonas.*
(Symposium on **Genetics of Organelles**)
 12. **GRAY, M.W.** (1987) **UCLA-CIAR Western Winter Workshop on The Evolution of Genes and Genomes**, Lake Tahoe, CA, Mar. 4-7. *Ribosomal RNA and organelle origins.*
 13. **BOER, P.H. AND GRAY, M.W.** (1987) **Royal Society Discussion Meeting on Mitochondrial Biogenesis**, London, England, May 28-29. *Organization and expression of algal mitochondrial DNA.*
 14. **GRAY, M.W.** (1987) **30th Annual Meeting of the Canadian Federation of Biological Societies**, Winnipeg, MB, June 22-26. *Organelle origins and ribosomal RNA.*
(Boehringer Mannheim Award Lecture)
 15. **GRAY, M.W.** (1987) **Meeting on Molecular Biology of Mitochondria and Chloroplasts**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, Aug. 25-30. *Ribosomal RNA genes and evolution of mitochondria.*
 16. **GRAY, M.W.** (1987) **1st Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-13. *Origins of mitochondria.*
 17. **GRAY, M.W.** (1988) **The Fifth Annual Biology Grad Symposium on Evolution**, Carleton University, Ottawa, ON, Feb. 26. *The bacterial ancestry of plastids and mitochondria.*
 18. **GRAY, M.W., BOER, P.H., COLLINGS, J.C., HEINONEN, T.Y.K., SPENCER, D.F. AND SCHNARE, M.N.** (1988) **14th International Congress of Biochemistry**, Prague, Czechoslovakia, July 10-15. *Ribosomal RNA genes in pieces.*
 19. **GRAY, M.W., CEDERGREN, R., ABEL, Y. AND SANKOFF, D.** (1988) **4th International Congress of Cell Biology**, Montreal, QC, Aug. 14-19. *The origin of mitochondria.*
 20. **GRAY, M.W., BOER, P.H., BOULANGER, J., HEINONEN, T.Y.K., LEMIEUX, C., SCHNARE, M.N. AND TURMEL, M.** (1988) **Meeting on Ribosome Synthesis**, Cold Spring Harbor, NY, Sept. 21-25. *Discontinuous ribosomal RNAs in mitochondria and chloroplasts.*
 21. **GRAY, M.W.** (1988) **14th Annual EMBO Symposium on Organelle Genomes and the Nucleus**, Heidelberg, Germany, Sept. 26-29. *Mitochondrial genome diversity, ribosomal RNA sequences, and evolution of mitochondrial DNA.*
 22. **GRAY, M.W.** (1988) **2nd Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Ste. Marguerite Stn., QC, Oct. 13-16. *Progress towards a phylogeny of mitochondria.*
 23. **JOYCE, P.B.M. AND GRAY, M.W.** (1989) **13th International tRNA Workshop**, University of British Columbia, Vancouver, BC, June 4-9. *Native and chloroplast DNA-derived transfer RNA genes in wheat mitochondrial DNA.*

24. **GRAY, M.W.** (1989) **Canadian Society of Plant Physiologists/ American Society of Plant Physiologists Joint Meeting**, Toronto, ON, July 30-Aug. 3.
Origin and evolution of the mitochondrial genome.
(The President's Symposium on **Evolution, Function and Structure of Organellar- and Nuclear-Coded Proteins**).
25. **GRAY, M.W.** AND SCHNARE, M.N. (1989) **American Society of Microbiology Conference on Ribosomes**, East Glacier, MT, Aug. 6-11.
Evolution of the modular structure of ribosomal RNA.
26. **GRAY, M.W.** (1989) **Workshop on Molecular Evolution**, Marine Biological Laboratory, Woods Hole, MA, Aug. 20-Sept. 1.
Mitochondrial genome evolution.
27. **GRAY, M.W.** (1989) **3rd Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Sidney, BC, Sept. 6-10.
Evolution of ribosomal RNA.
28. **GRAY, M.W.** (1990) **University of Florida Winter Organelle Meeting**, Clearwater, FL, Feb. 22-25.
Toward a phylogeny of mitochondria: progress and pitfalls.
29. **COVELLO, P.S.** AND **GRAY, M.W.** (1990) **Meeting on RNA Processing**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 16-20.
RNA editing in plant mitochondria: what we can learn from sequence comparisons.

30. **GRAY, M.W.** (1990) **33rd Annual Meeting of the Canadian Federation of Biological Societies**, Dalhousie University, Halifax, NS, June 14-16.
From the many to the one?: evolution of rRNA structural complexity.
(Symposium on **Ribosomal RNA: Structure, Function and Evolution**)
31. **GRAY, M.W.** (1990) **Gordon Research Conference on Extrachromosomal Elements**, Plymouth State College, Plymouth, NH, June 18-22.
Genes and gene expression in wheat mitochondria.
32. **GRAY, M.W.**, SPENCER D.F. AND LONERGAN, K. (1990) **Genetics Society of America/Genetics Society of Canada Joint Meeting**, San Francisco, CA, July 18-21.
Charting the course of mitochondrial genome evolution.
33. **GRAY, M.W.**, SPENCER D.F. AND LONERGAN, K. (1990) **Fourth International Workshop on Plant Mitochondria**, Cornell University, Ithaca, NY, Sept. 23-27.
The phylogenetic position of the plant mitochondrial genome.
34. COVELLO, P.S., HANIC-JOYCE, P.J. AND **GRAY, M.W.** (1990) **Fourth International Workshop on Plant Mitochondria**, Cornell University, Ithaca, NY, Sept. 23-27.
Making messages: transcription initiation and RNA editing in plant mitochondria.
35. AUCHINCLOSS, A.H., MENASSA, R., SINGH, M., COVELLO, P.S., **GRAY, M.W.** AND **BROWN, G.G.** (1990) **Fourth International Workshop on Plant Mitochondria**, Cornell University, Ithaca, NY, Sept. 23-27.
Transcription initiation sites of the soybean mitochondrial genome.
36. **GRAY, M.W.** (1990) **Indiana Molecular Biology Symposium V on Evolution of Genetic and Developmental Systems**, Indiana University, Bloomington, IN, Oct. 28-31.
Origin and evolution of mitochondrial DNA.
37. **GRAY, M.W.** AND COVELLO, P.S. (1991) **34th Annual Meeting of the Canadian Federation of Biological Societies**, Queen's University, Kingston, ON, June 9-11.
RNA editing in plant mitochondria.
(Symposium on **RNA Processing and Regulation of mRNA Expression**)
38. **GRAY, M.W.** (1991) **5th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Québec, QC, Aug. 10-14.
How many origins for organelles?
39. **GRAY, M.W.** AND COVELLO, P.S. (1991) **Third International Congress of Plant Molecular Biology (Molecular Biology of Plant Growth and Development)**, Tucson, AZ, Oct. 6-11.
RNA editing and gene migration in plant mitochondria.
(Symposium on **Mitochondria: Mitochondrial Gene Organization**)
40. **GRAY, M.W.**, SPENCER, D.F., MURPHY, C.A. AND DOUGLAS, S.E. (1992) **Abstracts of the 158th National Meeting of the American Association for the Advancement of Science**, Chicago, IL, Feb. 6-11, pg. 57.
Cryptomonads show evidence of endosymbiosis by a eukaryotic alga.
(Symposium on **Genetic Information**)
41. **GRAY, M.W.** (1992) **The Origin and Evolution of Prokaryotic and Eukaryotic Cells**, Shimoda, Japan, Apr. 22-25.
Fragmented ribosomal RNAs: functional and evolutionary significance.
42. **GRAY, M.W.** AND LONERGAN, K.M. (1992) **HFSP Workshop on RNA Editing in Plant Mitochondria and Chloroplasts - Comparison with RNA Editing Processes in Trypanosomes, Physarum and Mammalia**, Berlin, Germany, Sept. 15-20.
Transfer RNA editing in Acanthamoeba castellanii mitochondria.
43. **Covello, P.S.** and **Gray, M.W.** (1992) **HFSP-Workshop on RNA Editing in Plant Mitochondria and Chloroplasts - Comparison with RNA Editing Processes in Trypanosomes, Physarum and Mammalia**, Berlin, Germany, Sept. 15-20.
A model for the evolution of RNA editing.
44. **GRAY, M.W.** AND LONERGAN, K.M. (1993) **15th International tRNA Workshop**, Cap d'Agde, France, May 30 - June 4.
Editing of transfer RNAs.
45. **LANG, B.F.**, **GRAY, M.W.** AND **BURGER, G.** (1993) **Annual Meeting of the Genetics Society of Canada**, Manoir du Lac Delage, QC, June 11-14.
Molecular evolution of mitochondrial genomes.

46. **GRAY, M.W.** (1993) **Annual Meeting of the Canadian Society of Plant Molecular Biology**, University of Toronto, Toronto, ON, Aug. 14-17.
The evolutionary origin of mitochondria: mitochondrial genome organization and diversity in plants, algae and non-photosynthetic protists.
47. **GRAY, M.W.**, BURGER, G. AND LANG, B.F. (1993) **XV International Botanical Congress**, Pacifico Yokohama, Yokohama, Japan, Aug. 28 - Sept. 3.
Mitochondrial genome organization and diversity in plants and algae: evolutionary considerations. (Symposium on **Organization of Organellar Genome**)
48. **GRAY, M.W.** (1993) **7th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Banff, AB, Oct. 20-23.
On the evolution of RNA editing.
49. **GRAY, M.W.** (1994) **One Day Special Meeting, Linnean Society of London, Modern Views on Kingdoms and Domains. Is Hogg's Protoctista a Suitable Classification for the Late 20th Century?** Burlington House, Piccadilly, London, U.K., Apr. 14.
Mitochondrial phylogeny & evolution.
50. **GRAY, M.W.** (1994) **Gordon Research Conference on Mitochondria and Chloroplasts**, Volterra, Italy, May 1-6.
Transfer RNA editing in mitochondria: characteristics and evolution.
51. LONERGAN, K.M., PRICE, D.H. AND **GRAY, M.W.** (1994) **EMBO-CNRS Workshop on Nucleotide Modification and Base Conversion of RNA**, Aussois, France, May 4-8.
Mitochondrial transfer RNA editing in the amoeboid protozoan, Acanthamoeba castellanii. (Session 4, **RNA Editing - Part B**)
52. O'KELLY, C.J., PAQUIN, B., ROEWER, I., FORGET, L., BURGER, G., **GRAY, M.W.** AND LANG, B.F. (1994) **37th Annual Meeting of the Canadian Federation of Biological Societies**, Palais des Congrès, Montréal, QC, June 16-18.
Evolution of mitochondrial genomes in fungi and lower protists.
53. **GRAY, M.W.**, BURGER G. AND LANG, B.F. (1994) **4th International Congress of Plant Molecular Biology**, Amsterdam, Netherlands, June 19-24.
Mitochondrial genomes in unicellular algae and other protists. (Symposium on **Organelle Genomes**)
54. BURGER, G., O'KELLY, C.J., **GRAY, M.W.**, CEDERGREN, R.C., TURMEL, M., LEMIEUX, C., SANKOFF, D., GOLDING, B. AND LANG, B.F. (1994) **10th Biennial Meeting of the International Society for Evolutionary Protistology (ISEP-10)**, Dalhousie University, Halifax, NS, Aug. 4-10.
The diversification of mitochondria in protists: megasequencing of microgenomes. (Session on **Small Genomes**)
55. **GRAY, M.W.**, GREENWOOD, S.J., SMALLMAN, D.S., SPENCER, D.F. AND SCHNARE, M.N. (1994) **Overlap Day, 10th Biennial Meeting of the International Society for Evolutionary Protistology (ISEP-10) and 8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10.
Split ribosomal RNAs and ribosome evolution. (Associated Symposium on **Evolution of Unusual Molecular Processes in Protists**)
56. LANG, B.F., O'KELLY, C., BURGER, G. AND **GRAY, M.W.** (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
The megasequencing of microgenomes. (Presentation by members of the Organelle Genome Megasequencing Program (OGMP))
57. **GRAY, M.W.**, LONERGAN, K.M., PRICE, D.M., LAFOREST, M.-J. AND LANG, B.F. (1994) **1994 Albany Conference**, Rensselaerville, NY, Oct. 6-9.
Transfer RNA editing in protozoan and fungal mitochondria.
58. **GRAY, M.W.**, GREENWOOD, S.J., SMALLMAN, D.S., SPENCER, D.F. AND SCHNARE, M.N. (1994) **20th Taniguchi Symposium (Biophysics Division) on Tracing Biological Evolution in Protein and Gene Structures**, Nagoya, Japan, Oct. 31-Nov. 5.
Ribosomal RNA in pieces: a modern paradigm of the primordial ribosome?
59. **GRAY, M.W.** (1994) **Banbury Center Conference on Evolution of Genes and Genomes**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, Nov. 9-12.
The organelle genome megasequencing project: exploring mitochondrial DNA evolution.

60. BURGER, G., **GRAY, M.W.**, REITH, M. AND LANG, B.F. (1995) ***Plant Mitochondria: from Gene to Function***, Duke University, Durham, NC, Apr. 7-12.
Complete sequence of the mitochondrial genome of the rhodophyte, Porphyra purpurea: a mitochondrial perspective on the evolution of red and green algae.
61. SPENCER, D.F. AND **GRAY, M.W.** (1995) ***Frontiers in Translation, An International Conference on the Structure and Function of the Ribosome***, Victoria, BC, May 20-25.
Mitochondrial ribosomal RNA genes in the early diverging protist, Euglena gracilis: fragmented genes in a fragmented genome.
62. BURGER, G., LANG, B.F., REITH, M. AND **GRAY, M.W.** (1995) **9th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Val Morin, QC, Aug. 23-27.
Complete sequence of the mitochondrial genome of the rhodophyte alga, Porphyra purpurea. (Presentation by members of the Organelle Genome Megasequencing Program (OGMP))
63. **GRAY, M.W.** (1995) **EMBO Workshop on Molecular Evolution of Archaeal, Bacterial and Organelle Genomes**, Aronsborg, Bålsta, Sweden, Oct. 6-9.
Impact of large-scale sequencing on ideas about organellar genome origins and evolution.
64. BURGER, G., CEDERGREN, R., GOLDING, B., **GRAY, M.W.**, LANG, B.F., LEMIEUX, C., LITTLEJOHN, T.G., SANKOFF, D. AND TURMEL, M. (1995) **EMBO Workshop on Molecular Evolution of Archaeal, Bacterial and Organelle Genomes**, Aronsborg, Bålsta, Sweden, Oct. 6-9.
Mitochondrial genomes as a unique window on the evolutionary history of the lower eukaryotes.
65. **GRAY, M.W.** (1995) **Earth Systems Evolution Meeting, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Oct. 12-14.
The origin of organelles of respiration and photosynthesis.
66. **GRAY, M.W.** (1996) **134th Ordinary Meeting, Society for General Microbiology**, University of Warwick, Coventry, U.K., Mar. 25-29.
Co-evolution: organellar evolution.
(Main Symposium, ***Evolution of Microbial Life***)
67. **GRAY, M.W.**, BURGER, G., CEDERGREN, R., GOLDING, B., LEMIEUX, C., LITTLEJOHN, T.G., SANKOFF, D., TURMEL, M. AND LANG, B.F. (1996) **Genome Canada 96**, Ottawa, ON, June 13-16.
Mitochondrial genomes as a unique window to resolve the phylogeny of the eukaryotes.
68. BURGER, G., LASKOWSKA, M., RIOUX, P., LITTLEJOHN, T.G., CEDERGREN, R., GOLDING, B., LEMIEUX, C., SANKOFF, D., TURMEL, M., **GRAY, M.W.** AND LANG, B.F. (1996) **Genome Canada 96**, Ottawa, ON, June 13-16.
Management and analysis of sequence data from multiple organelle genomes.
69. **GRAY, M.W.** (1996) **Gordon Research Conference on Mitochondria and Chloroplasts**, Plymouth State College, Plymouth, NH, June 16-21.
Transcription in plant and protist mitochondria.
70. **GRAY, M.W.** (1996) **10th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Sidney, BC, Aug. 28-Sept. 1.
Ribosomal and small nuclear RNAs in Euglena gracilis.
71. **GRAY, M.W.** (1996) **EMBO Workshop on RNA Editing**, Maastricht, The Netherlands, Sept. 5-8.
Origin and evolution of RNA editing systems.
72. **GRAY, M.W.**, LONERGAN, K.M., PRICE, D.H., EDQVIST, J., LAFOREST, M.-J., ROEWER, I. AND LANG, B.F. (1996) **EMBO Workshop on RNA Editing**, Maastricht, The Netherlands, Sept. 5-8.
Editing of transfer RNA in protozoan and fungal mitochondria.
73. LANG, B.F., BURGER, G. AND **GRAY, M.W.** (1997) **General Meeting of the American Society for Microbiology**, Miami Beach, FL.
Comparative genomics approach to the evolution of mitochondria.
74. **GRAY, M.W.** (1997) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 19-24.
Transfer RNA editing in Acanthamoeba castellanii mitochondria.
75. BURGER, G., LANG, B.F. AND **GRAY, M.W.** (1997) **2nd International Congress on Symbiosis**, Marine Biological Laboratory, Woods Hole, MA, Apr. 13-18.
Early evolution of protist mitochondria.

76. **GRAY, M.W.** (1997) **Howard Hughes Medical Institute Scientific Workshop on *bcl-2 Protein and Mitochondrial Function***, HHMI Conference Center, Chevy Chase, MD, May 28-29.
Similarities and differences in mitochondrial genome organization and expression throughout the eukaryotic lineage.
77. **GRAY, M.W.**, BURGER, G., CEDERGREN, R., GOLDING, G.B., LEMIEUX, C., SANKOFF, D., TURMEL, M. AND LANG, B.F. (1997) **41st Annual Meeting of the Genetics Society of Canada**, The University of Western Ontario, London, ON, June 17-20.
A genomics approach to mitochondrial DNA evolution.
78. **LANG, B.F.**, **BURGER, G.**, O'KELLY, C.J. AND **GRAY, M.W.** (1997) **10th International Congress on Protistology (ICOP-X)**, Sydney, Australia, July 21-25.
*The mitochondrial DNA of *Reclinomonas americana* resembles a eubacterial genome in miniature.*
79. **GRAY, M.W.** (1997) **Workshop on *Molecular Evolution***, Marine Biological Laboratory and Canadian Institute for Advanced Research, Woods Hole, MA, Aug. 3-15.
A genomics approach to mitochondrial DNA evolution.
80. **GRAY, M.W.** (1997) **Workshop on *Evolution: A Molecular Point of View***, Center for Advanced Studies in the Space Life Sciences, Marine Biological Laboratory, Woods Hole, MA, Oct. 24-26.
A genomics approach to mitochondrial DNA evolution.
81. **GRAY, M.W.** (1998) **Workshop on *The Revolution in Systematics***, Fundación Ramón Areces, Madrid, Spain, Feb. 23-24.
Probing the origin and evolution of mitochondria: a genomic perspective.
82. **GRAY, M.W.** (1998) **Workshop on *Plant Mitochondrial Genetics and Molecular Biology***, American Genetic Association, North Carolina State University, Raleigh, NC, May 23.
Genes and proteins of the transcriptional apparatus in wheat mitochondria.
83. **GRAY, M.W.**, LEMIEUX, C., BURGER, G., LANG, B.F., OTIS, C., PLANTE, I. AND TURMEL, M. (1998) **International Congress on *Plant Mitochondria: From Gene to Function (ICPM 98)***, Aronsborg, Sweden, June 22-27.
Mitochondrial genome organization and evolution within the green algae and land plants.
84. **GRAY, M.W.** (1998) **12th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Mont-Rolland, QC, July 25-29.
*Small nuclear and nucleolar RNAs in *Euglena gracilis*.*
85. **LANG, B.F.**, **GRAY, M.W.**, O'KELLY, C.J. AND BURGER, G. (1998) **Joint Symposium (*Origins of Mitochondria and Chloroplasts*) of the International Society of Evolutionary Protistology (ISEP), the Society of Protozoology (SOP) and the Phycological Society of America (PSA)**, Flagstaff, AZ, Aug. 4.
A comparative genomics approach to the evolution of mitochondria.
86. **GRAY, M.W.** (1998) **ATCC Symposium on *Bioinformatics and Biodiversity***, American Type Culture Collection, Manassas, VA, Nov. 6.
A comparative genomics strategy applied to questions of mitochondrial origin and evolution.
87. **GRAY, M.W.** (1999) **Gordon Research Conference on *RNA Editing***, Ventura, CA, Jan. 24-29.
*A novel nucleotide incorporation activity implicated in the editing of mitochondrial transfer RNAs in *Acanthamoeba castellanii*.*
88. **GRAY, M.W.** (1999) **CIAR All-Programs Congress**, Banff, AB, May 20-23.
From RNA to us.
(Session III - Evolutionary Biology)
89. **LANG, B.F.**, **GRAY, M.W.**, O'KELLY, C.J. AND BURGER, G. (1999) **7th Annual Conference of the Society for Molecular Biology and Evolution**, Brisbane, Australia, July 11-14.
A comparative genomics approach to the evolution of mitochondria.
90. **G. BURGER**, LANG, B.F., LEMIEUX, C., TURMEL, M. AND **GRAY, M.W.** (1999) **XVI International Botanical Congress**, St. Louis, MO, Aug. 1-7.
Early evolution of eukaryotes from a mitochondrial perspective.
(General Symposium on *Phylogeny of Life: The Bacterial Perspective on Eukaryotic and Prokaryotic Evolution*)
91. **GRAY, M.W.** (1999) **XVI International Botanical Congress**, St. Louis, MO, Aug. 1-7.
Mitochondrial genome evolution.
(Keynote Symposium on *Genome Evolution*)

92. **GRAY, M.W.** (1999) **13th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Banff, AB, Oct. 20-24.
Thoughts on the evolution of the eukaryotic rRNA processing system.
93. **GRAY, M.W.**, LANG, B.F. AND BURGER, G. (2000) **6th International Congress of Plant Molecular Biology**, Québec, Canada, June 18-24.
The sisterhood of red and green algae: a mitochondrial perspective.
94. BURGER, G., **GRAY, M.W.** AND LANG, B.F. (2000) **13th Meeting of the International Society of Evolutionary Protistology (ISEP)**, Ceske Budejovice, Czech Republic, July 31-Aug. 4.
Unusual structures of mitochondrial genomes in protists.
95. **GRAY, M.W.** (2000) **EMBO Workshop on Origins of Cells and Organelles**, Höör, Sweden, Sept. 8-11.
Mitochondrial evolution.
96. **GRAY, M.W.** (2000) **14th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Digby Pines, Digby, NS, Oct. 11-15.
Evolution of the mitochondrial genome within the green algal/land plant lineage.
97. **GRAY, M.W.** (2000) **Symposium on New Therapies and the Genome**, Montréal, QC, Nov. 26-29.
Mitochondrial genomics and evolution.
98. **GRAY, M.W.** (2001) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 21-26.
Mitochondrial transfer RNA editing in amoeboid protozoa.
99. **GRAY, M.W.**, LANG, B.F. AND BURGER, G. (2001) **Bari Meeting on Mitochondria: Evolution, Genomics, Homeostasis and Pathology**, Selva di Fasano, Italy, May 9-12.
Evolution of a mitochondrial tRNA editing system.
100. LANG, B.F., **GRAY, M.W.** AND BURGER, G. (2001) **44th Annual Meeting of the Canadian Society of Biochemistry and Molecular & Cellular Biology**, Alliston, ON, May 31-June 3.
Lessons from the comparative analysis of primitive mitochondrial genomes.
(The CIAR Symposium on **Comparative and Evolutionary Genomics**)
101. BURGER, G., **GRAY, M.W.** AND LANG, B.F. (2002) **Gordon Research Conference on Molecular Evolution**, Ventura, CA, Jan. 13-18.
Primitive eukaryotes from a mitochondrial genomics perspective
102. LANG, B.F., **GRAY, M.W.** AND BURGER, G. (2002) **Spring Academy of the German Society of Genetics**, Wittenberg, Germany.
Eukaryotic evolution from a mitochondrial perspective.
103. LANG, B.F., **GRAY, M.W.** AND BURGER G (2002) **14th Meeting of the International Society of Evolutionary Protistology (ISEP XIV)**, Vancouver, BC, June 19-22.
Phylogeny of early mitochondriate eukaryotes: the jakobid flagellates.
104. **GRAY, M.W.** AND WATKINS, R.F. (2002) **16th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Harrison Hot Springs Resort, BC, Sept. 28 - Oct. 2.
The Protist EST Program (PEP) and EST exploration of Acanthamoeba castellanii.
105. **GRAY, M.W.** (2002) **Microbial Evolution: Concepts and Controversies**, Montréal, QC, Oct. 17-19.
Contemporary issues in mitochondrial origins and evolution.
106. **GRAY, M.W.** (2002) **Advances in Genome Technology and Bioinformatics**, Marine Biological Laboratory, Woods Hole, MA, Oct. 25.
Mitochondrial genome evolution.
107. **GRAY, M.W.** (2002) **Symposium on Evolutionary and Comparative Genomics**, Puerto Vallarta, Mexico, Nov. 1-4.
Evolution of mitochondrial genomes.
108. **GRAY, M.W.** (2002) **XXIV Meeting of the Mexican Society for Biochemistry**, Puerto Vallarta, Mexico, Nov. 4.
Evolution of a mitochondrial transfer RNA editing system.
(Plenary Mini-Symposium on **Genomes and Evolution**)
109. **GRAY, M.W.** (2002) **Lund Life Science Symposium on Evolutionary Genomics**, Lund University, Lund, Sweden, Dec. 4.
The mitochondrial genome: extraordinarily variable structure but common evolutionary origin.

110. **GRAY, M.W.** (2003) **4th International Symbiosis Society Congress**, St. Mary's University, Halifax, Nova Scotia, Aug. 17-23.
From bacterial symbiont to organelle: Unravelling the evolutionary history of the mitochondrial genome.
(Symposium 15: **Evolutionary Implications of Symbiosis**)
111. **RUSSELL, A.** AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Modification guide RNAs in Euglena gracilis.
112. **GRAY, M.W.** (2003) **11th International Conference on Microbial Genomes**, Durham, NC, Sept. 28-Oct. 2
Evolution of the mitochondrial genome: a study in extraordinary structural variation.
113. **BURGER, G.**, **LANG, B.F.** AND **GRAY, M.W.** (2003) **Mol. Cell. Proteomics** 2, 918.
Diversity and evolution of mitochondrial genome architecture and information content.
(Symposium on **Mitochondrial Biogenesis and Evolution**, HUPPO 2nd Annual & IUBMB XIX World Congress, Montreal, QC, Oct. 8-11, 2003)
114. **GRAY, M.W.** (2003) **Mol. Cell. Proteomics** 2, 918.
Diversity and evolution of mitochondrial RNA editing systems.
(Symposium on **Mitochondrial Biogenesis and Evolution**, HUPPO 2nd Annual & IUBMB XIX World Congress, Montreal, QC, Oct. 8-11, 2003)
115. **WATKINS, R.F.** AND **GRAY, M.W.** (2004) **Frontiers in Genomics: Insights into Protist Evolutionary Biology**, University of Iowa, IW.
The Protist EST Program.
116. **GRAY, M.W.** (2004) **Gordon Research Conference on Mitochondria & Chloroplasts**, Kimball Union Academy, Meriden, NH, Jul 25-30.
Mitochondrial evolution: going off in all directions.
117. **WATKINS, R.F.** AND **GRAY, M.W.** (2004) **18th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Hotel du Lac Carling, QC, Oct. 13-17.
LGT in bacterivorous eukaryotes: the results of stringent scans of amoebozoan EST libraries.
118. **GRAY, M.W.** (2005) **International Conference on Microbial Genomes**, Halifax, NS, Apr. 13-16.
The Protist EST Program: an exploration of diversity and evolution within the world of eukaryotic microbes.
119. **GRAY, M.W.** (2006) **The Kurland Symposium**, Uppsala University, Uppsala, Sweden, Apr. 7.
Speculations on the origin and evolution of RNA editing.
120. **GRAY, M.W.** (2006) **Canadian Society of Microbiologists-Genetics Society of Canada 2006 Conference**, London, ON, June 18-21.
The Protist EST Program: an exploration of genetic diversity and evolution within the world of eukaryotic microbes.
121. **GRAY, M.W.** (2007) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 14-19.
Biochemistry of mitochondrial 5' tRNA editing.
122. **GRAY, M.W.** (2007) **FEBS Advanced Lecture Series, Mitochondria in Life, Death and Disease**, Aussois, France, April 25-29.
Genomics vs. proteomics: two views of mitochondrial evolution.
(Symposium I: *Mitochondrial Evolution*)
123. **GRAY, M.W.** (2007) **3rd Genome Training Grant Symposium, Evolution of the Mitochondrial Genome**, University of Washington, Seattle, WA, June 12.
Genomics vs. proteomics: different views of mitochondrial evolution.
124. **GRAY, M.W.** (2008) **PROTIST2008 (ISOP59/ISEPXVII)**, Dalhousie University, Halifax, NS, July 21-26.
Spectacular and bizarre: RNA editing and its evolution in protists.
(Invited Plenary Speaker)
125. **GRAY, M.W.** (2008) **Gordon Research Conference on Mitochondria & Chloroplasts**, University of New England, Biddeford, ME, August 10-15.
Two views of mitochondrial evolution: genomics vs. proteomics.
126. **GRAY, M.W.** (2009) **International Conference for Plant Mitochondrial Biology (ICPMB)**, Grandlibakken Conference Center & Lodge, Lake Tahoe, CA, May 9-14.
First among equals: evolution of the plant mitochondrial genome.

127. LEGER, M., GAWRYLUK, R.M.R., **GRAY, M.W.** AND ROGER, A.J. (2009) **18th Meeting of the International Society for Evolutionary Protistology (ISEP)**, Kanazawa, Japan, July 2-7. *Anaerobic metabolism enzymes in Acanthamoeba castellanii*.
128. HOPKINS, J.F., SPENCER, D.F., **GRAY, M.W.** AND ARCHIBALD, J.M. (2009) **Annual Meeting of the Society of Molecular Biology and Evolution (SMBE 2010)**, Lyon Convention Center, Lyon, France, July 4-8. *Proteomics reveals complex evolution of plastid- and nucleomorph-targeted proteins in the chlorarachniophyte Bigeloviella*.
129. **GRAY, M.W.** (2009) **Joint Symposium of German Academy of Sciences Leopoldina, SFB 429 and SFB-TR1, Molecular Genetics of Chloroplasts and Mitochondria**, Free University of Berlin, Berlin, Germany, September 20-23. *Genomics vs. proteomics: two views of mitochondrial evolution*.
130. **GRAY, M.W.** (2011) **Gordon Research Conference on RNA Editing: Editing and Modification of RNA and DNA**, Galveston, TX, January 9-14. *The evolutionary origin of RNA editing*.
131. **GRAY, M.W.** (2011) **EMBO Conference on Comparative Genomics of Eukaryotic Microorganisms**, Sant Feliu de Guixols, Girona, Spain, October 15-20. *Mitochondrial DNA and mitochondrial genes in Euglena gracilis*.
132. **GRAY, M.W.** (2012) **Mitochondrial Medicine 2012: Capitol Hill, From Genomics and Systems Biology to Translation**, Washington, DC, June 13-16. *Genomics vs. proteomics: two views of mitochondrial evolution (Session on Genomics of Mitochondrial Biology)*
133. **GRAY, M.W.** (2013) **International Congress of Protistology (ICOP XIV)**, Vancouver, BC, July 28-Aug. 2. *Mitochondrial evolution: genome vs. proteome (Symposium 7: Organelles & Endosymbionts)*
134. **GRAY, M.W.** (2013) **12th International Colloquium, Endocytobiology and Symbiosis**, Halifax, NS, Aug. 18-22. *Genome vs. proteome: an updated perspective on the origin of the mitochondrion*
135. **GRAY, M.W.** (2014) **Arthur M. Sackler Colloquium, Symbioses Becoming Permanent: The Origins and Evolutionary Trajectories of Organelles**, Beckman Center, Irvine, CA, Oct. 15-17. *One from two (or more): mergers, acquisitions, downsizing and innovation in eukaryotic cell evolution (Distinctive Voices Public Lecture)*
136. **Gray, M.W.** (2015) **Society for General Microbiology Annual Conference 2015**, Birmingham, U.K., Mar. 30-Apr. 2. *The pre-endosymbiont hypothesis: a new look at the origin of mitochondria (Session S9: Mitochondria and Related Organelles in Microbial Eukaryotes)*
137. **Gray, M.W.** (2015) **MitoCross Symposium 2015: Mitochondria at the Crossroad**, Strasbourg, France, Sept. 21-22. *Properties and evolution of a mitochondrial tRNA editing system*
138. **GRAY, M.W.** (2015) **EMBO Conference on Exploring the genomic complexity and diversity of eukaryotes**, Sant Feliu de Guixols, Girona, Spain, Oct. 17-22. *Mitochondrial genomes—anything goes (Opening Lecture)*
139. **GRAY, M.W.** (2016) **Evolution of Cells, Genomes and Proteins**, Nanyang Technological University, Singapore, Feb. 1-3. *Mitochondrial evolution: what, how and why*
140. **GRAY, M.W.** (2016) **Evolution of Cells, Genomes and Proteins**, Bintan, Indonesia, Feb. 4-6. *Properties and evolution of a tRNA editing enzyme*
141. **GRAY, M.W.** (2017) 115th International Titisee Conference on **Evolutionary Mitochondrial Biology: Molecular, Biochemical, and Metabolic Diversity**, Schwarzwaldhotel Titisee, Mar. 29–Apr. 2. *The mitochondrial proteome of Andaluca godoyi, an early-diverging eukaryote with the most gene-rich mitochondrial genome*

142. **GRAY, M.W.** (2018) Cold Spring Harbor Laboratory Meeting on ***The Evolving Concept of Mitochondria: From Symbiotic Origins to Therapeutic Opportunities***, Cold Spring Harbor, NY, Oct. 18-21.
What do we really know about the origin of mitochondria?

VII. Contributed Conference Presentations (presenter's name underlined)

1. GRAY, M.W. (1974) *Proc. Can. Fed. Biol. Soc.* **17**, 116.
Distinctive species of RNA in a highly-purified mitochondrial fraction from wheat embryos.
(17th Annual Meeting of the Canadian Federation of Biological Societies, McMaster University, Hamilton, ON, June 25-28)
2. CUNNINGHAM, R.S., BONEN, L., DOOLITTLE, W.F. AND GRAY, M.W. (1976) *Proc. Can. Fed. Biol. Soc.* **19**, 121.
Nucleotide sequence analysis of wheat cytosol and mitochondrial ribosomal RNA.
(19th Annual Meeting of the Canadian Federation of Biological Societies, Dalhousie University, Halifax, NS, June 15-18)
3. GRAY, M.W. (1977) *Ribosome Workshop II*, Memorial University of Newfoundland, St. John's, NF, July 19-21.
The mitochondrial ribosomal RNAs of germinating wheat embryos.
4. BONEN, L. AND GRAY, M.W. (1979) *N.A.T.O. Advanced Studies Institute, F.E.B.S. Advanced Course on Genome Organization and Expression in Plants*, University of Edinburgh, Edinburgh, Scotland, July 11-21.
Mapping of genes for wheat mitochondrial ribosomal and transfer RNAs.
5. SPENCER, D.F., BONEN, L. AND GRAY, M.W. (1980) *12th International Bari Conference on Mitochondrial, The Organization and Expression of the Mitochondrial Genome*, Martina Franca, Italy, June 23-28.
Primary sequence of wheat mitochondrial 5S ribosomal RNA: functional and evolutionary implications.
6. SPENCER, E.F., BONEN, L. AND GRAY, M.W. (1980) *E.M.B.O. - F.E.B.S. tRNA Workshop*, Strasbourg, France, July 16-21.
Primary sequence of wheat mitochondrial 5S ribosomal RNA: evolutionary considerations and implications for interaction with mitochondrial transfer RNAs.
7. GRAY, M.W., BONEN, L., FALCONET, D., HUH, T.Y., SCHNARE, M.N. AND SPENCER, D.F. (1981) *Mitochondrial Genes*, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 13-17.
Sequences of plant mitochondrial ribosomal RNAs and organization of their genes.
8. SPENCER, D.F., BONEN, L. AND GRAY, M.W. (1981) *The Evolution of the Eukaryotic Genome and Its Components*, Dalhousie University, Halifax, NS, July 12-15.
Primary sequence of wheat mitochondrial 5S ribosomal RNA: functional and evolutionary implications.
9. SCHNARE, M.N. AND GRAY, M.W. (1981) *The Evolution of the Eukaryotic Genome and Its Components*, Dalhousie University, Halifax, NS, July 12-15.
Sequences of unusual ribosomal RNAs from Crithidia fasciculata, a trypanosomatid protozoan.
10. SCHNARE, M.N. AND GRAY, M.W. (1982) *Proc. Can. Fed. Biol. Soc.* **25**, 108.
Eubacterial properties of the 3'-terminal sequence of wheat mitochondrial 18S ribosomal RNA.
(25th Annual Meeting of the Canadian Federation of Biological Societies, University of Alberta, Edmonton, AB, June 14-18)
11. SCHNARE, M.N. AND GRAY, M.W. (1982) *N.A.T.O. Advanced Studies Institute, F.E.B.S. Advanced Course on Structure and Function of Plant Genomes*, Porto Portese, Italy, Aug. 23-Sept. 2.
Eubacterial properties of the 3'-terminal sequence of wheat mitochondrial 18S ribosomal RNA.
12. SCHNARE, M.N. AND GRAY, M.W. (1983) *Meeting on RNA Processing*, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 18-22.
The 3'-terminal sequence of wheat mitochondrial 26S rRNA.
13. BONEN, L., BOER, P.H. AND GRAY, M.W. (1984) *EMBO Workshop on Plant Mitochondrial DNA: Organization, Information Content, Expression*, Melrose, Scotland, May 21-25.
Protein coding genes in wheat mitochondria.
14. BONEN, L., BOER, P.H. AND GRAY, M.W. (1985) *First Canadian Plant Molecular Biology Workshop*, University of Guelph, Guelph, ON, May 27-28.
Protein coding genes in wheat mitochondria.

15. BONEN, L., BOER, P.H. AND GRAY, M.W. (1985) **13th International Congress of Biochemistry**, Amsterdam, The Netherlands, Aug. 25-30.
Protein coding genes in wheat mitochondria.
16. BOER, P.H. AND GRAY, M.W. (1985) **13th International Congress of Biochemistry**, Amsterdam, The Netherlands, Aug. 25-30.
Expression of the mitochondrial genome of Chlamydomonas reinhardtii.
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Protein coding genes in wheat mitochondria.
18. BOER, P.H. AND GRAY, M.W. (1985) **International Symposium on Achievements and Perspectives in Mitochondrial Research**, Bari, Italy, Sept. 2-6.
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Characterization of a mouse mitochondrial transcription system.
(Cetus-UCLA Symposium on **Transcriptional Control Mechanisms**, Keystone, CO, Apr. 6-13)
21. LEMIEUX, C., TURMEL, M., BOULANGER, J. AND GRAY, M.W. (1986) **International Research Conference on Extrachromosomal Elements in Lower Eukaryotes**, University of Illinois at Urbana-Champaign, Urbana, IL, June 1-5.
Sequence analysis of the chloroplast gene for the large subunit ribosomal RNA from the green alga Chlamydomonas eugametos.
22. HEINONEN, T.Y.K., SCHNARE, M.N., YOUNG, P.G. AND GRAY, M.W. (1986) **International Research Conference on Extrachromosomal Elements in Lower Eukaryotes**, University of Illinois at Urbana-Champaign, Urbana, IL, June 1-5.
Discontinuous ribosomal RNAs in Tetrahymena pyriformis mitochondria.
23. LEMIEUX, C., TURMEL, M., BOULANGER, J. AND GRAY, M.W. (1986) **First Annual Workshop of the Canadian Society for Plant Molecular Biology**, Erindale Campus of the University of Toronto, Mississauga, ON, June 5-7.
Sequence analysis of the chloroplast gene for the large subunit ribosomal RNA from the green alga Chlamydomonas eugametos.
24. GRAY, M.W. AND CLAYTON, D.A. (1986) **Proc. Can. Fed. Biol. Soc. 29**, 156.
Characterization of a mouse mitochondrial transcription system.
(29th Annual Meeting of the Canadian Federation of Biological Societies, University of Guelph, Guelph, ON, June 16-20)
25. SCHNARE, M.N., HEINONEN, T.Y.K., YOUNG, P.G. AND GRAY, M.W. (1986) **Proc. Can. Fed. Biol. Soc. 29**, 191.
Discontinuous ribosomal RNAs in Tetrahymena pyriformis mitochondria.
(29th Annual Meeting of the Canadian Federation of Biological Societies, University of Guelph, Guelph, ON, June 16-20)
26. SANKOFF, D., ABEL, Y., CEDERGREN, R. AND GRAY, M.W. (1987) **UCLA-CIAR Western Winter Workshop on The Evolution of Genes and Genomes**, Lake Tahoe, CA, Mar. 4-7.
Validating branching sequences in a parsimonious phylogeny.
27. SPENCER, D.F., COLLINGS, J.C., SCHNARE, M.N. AND GRAY, M.W. (1987) **Meeting on RNA Processing**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 13-17.
Multiple spacer sequences in the nuclear large subunit ribosomal RNA gene in Crithidia fasciculata.
28. SPENCER, D.F. AND GRAY, M.W. (1987) **Joint Meeting Canadian Society of Plant Physiologists and Canadian Society for Plant Molecular Biology**, Queen's University, Kingston, ON, June 9-12.
Analysis of the 18S ribosomal DNA repeats in the wheat mitochondrial genome.
29. JOYCE, P.B.M., SPENCER, D.F., BONEN, L. AND GRAY, M.W. (1987) **Joint Meeting Canadian Society of Plant Physiologists and Canadian Society for Plant Molecular Biology**, Queen's University, Kingston, ON, June 9-12.
Wheat mitochondrial transfer RNA genes.

30. LEMIEUX, C., BOULANGER, J., GAUTHIER, A., **GRAY, M.W.**, LEE, R.W. AND TURMEL, M. (1987) **Joint Meeting Canadian Society of Plant Physiologists and Canadian Society for Plant Molecular Biology**, Queen's University, Kingston, ON, June 9-12.
Intron-mediated gene conversion in the chloroplast of Chlamydomonas.
31. BOER, P.H. AND **GRAY, M.W.** (1987) **Meeting on Molecular Biology of Mitochondria and Chloroplasts**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, Aug. 25-30.
Scrambled rRNA gene pieces in algal mitochondria.
32. JOYCE, P.B.M., SPENCER, D.F., BONEN, L. AND **GRAY, M.W.** (1987) **Meeting on Molecular Biology of Mitochondria and Chloroplasts**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, Aug. 25-30.
Wheat mitochondrial tRNA genes.
33. **GRAY, M.W.**, COOK, J.R. AND SCHNARE, M.N. (1988) **J. Cell Biochem. Suppl. 12D**, 20.
A highly fragmented large subunit RNA in the cytoplasmic ribosome of Euglena gracilis.
(Director's Sponsors - UCLA Symposium on *Molecular Biology of RNA*, Keystone, CO, Apr. 3-10).
34. CEDERGREN, R., **GRAY, M.W.**, ABEL, Y. AND SANKOFF, D. (1988) **J. Cell Biochem. Suppl. 12D**, 70.
Evolutionary relationships inferred from ribosomal RNA sequences.
(Director's Sponsors - UCLA Symposium on *Molecular Biology of RNA*, Keystone, CO, Apr. 3-10).
35. JOYCE, P.B.M., SPENCER, D.F. AND **GRAY, M.W.** (1988) **XVth International Congress of Genetics**, Toronto, ON, Aug. 20-27.
Rearrangements in sequences flanking duplicate, identical proline transfer RNA genes in wheat mitochondrial DNA.
36. SCHNARE, M.N., COOK, J.R. AND **GRAY, M.W.** (1988) Cold Spring Harbor Meeting on *Ribosome Synthesis*, Cold Spring Harbor, NY, Sept. 21-25.
Nuclear genes encoding discontinuous large subunit ribosomal RNAs in Crithidia fasciculata and Euglena gracilis.
37. JOYCE, P.B.M. AND **GRAY, M.W.** (1989) **Joint Annual Meeting of the Genetics Society of Canada and the Canadian Society for Plant Molecular Biology**, University of Calgary, Calgary, AB, June 11-14.
Chloroplast-like transfer RNA genes expressed in wheat mitochondria.
38. **GRAY, M.W.** AND HANIC-JOYCE, P.J. (1989) **32nd Annual Meeting of the Canadian Federation of Biological Societies**, University of Calgary, Calgary, AB, June 14-17.
Processing of tRNA precursors in a wheat mitochondrial extract.
39. COVELLO, P.S. AND **GRAY, M.W.** (1990) **University of Florida Winter Organelle Meeting**, Clearwater, FL, Feb. 22-25.
RNA editing in plant mitochondria: an interspecific comparison.
40. LONERGAN, K. AND **GRAY, M.W.** (1990) **University of Florida Winter Organelle Meeting**, Clearwater, FL, Feb. 22-25.
A polyphyletic origin of mitochondria?
41. COULTHART, M.B. AND **GRAY, M.W.** (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
An approach to rapid physical mapping of plant mitochondrial genomes.
42. AUCHINCLOSS, A.H., MENASSA, R., SINGH, M., COVELLO, P.S., **GRAY, M.W.** AND BROWN, G.G. (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
Transcription initiation sites of the soybean mitochondrial genome.
43. COVELLO, P.S. AND **GRAY, M.W.** (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
RNA editing in plant mitochondria: an interspecific comparison.
44. LONERGAN, K. AND **GRAY, M.W.** (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
Tracing the origin of plant mitochondria.
45. SCHNARE, M.N., COOK, J.R. AND **GRAY, M.W.** (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
Sixteen discrete RNA components in the cytoplasmic ribosome of Euglena gracilis.

46. LONERGAN, K. AND **GRAY, M.W.** (1990) **4th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Chaffey's Locks, ON, Aug. 25-29.
The phylogenetic position of Acanthamoeba mitochondria.
47. **GRAY, M.W.** AND COVELLO, P.S. (1992) **35th Annual Meeting of the Canadian Federation of Biological Societies**, Victoria, BC, June 18-20.
Evolutionary transfer of the cytochrome oxidase subunit 2 gene from the mitochondrion to the nucleus in soybean.
48. **GLOVER, K.E.** AND **GRAY, M.W.** (1992) **6th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Lunenburg, NS, Sept. 12-15.
The genetic origin of transfer RNAs in wheat mitochondria.
49. **GREENWOOD, S.J.** AND **GRAY, M.W.** (1992) **6th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Lunenburg, NS, Sept. 12-15.
Euglena rRNA processing: an example of the RNA world falling to pieces.
50. **COVELLO, P.S.** AND **GRAY, M.W.** (1992) **6th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Lunenburg, NS, Sept. 12-15.
Silent mitochondrial and active nuclear genes for subunit 2 of cytochrome c oxidase (cox2) in soybean: evidence for RNA-mediated gene transfer.
51. PLANTE, I., DENIS, S., ZHU, Y., WONG, Z., LONERGAN, K.M., **GRAY, M.W.** AND **BURGER, G.** (1992) **6th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Lunenburg, NS, Sept. 12-15.
Sequence of the Acanthamoeba castellanii mitochondrial genome.
52. **COVELLO, P.S.** AND **GRAY, M.W.** (1992) **HFSP-Workshop on RNA Editing in Plant Mitochondria and Chloroplasts - Comparison with RNA Editing Processes in Trypanosomes, Physarum and Mammalia**, Berlin, Germany, Sept. 15-20.
Silent mitochondrial and active nuclear genes for subunit 2 of cytochrome c oxidase (cox2) in soybean: evidence for RNA-mediated gene transfer.
53. **LITTLEJOHN, T.**, FORGET, L., **GRAY, M.**, **GREENWOOD, S.**, LANG, B.F., LONERGAN, K., PAQUIN, B., PLANTE, I., ROEWER, I., SCHNARE, M., WANG, Z., ZHU, Y. AND **BURGER, G.** (1993) **First International Symposium on Mapping and Sequencing of Small Genomes**, Paris, France, Mar. 28-30.
Phylogenetic analysis of organellar genomes.
54. **BURGER, G.**, CEDERGRÉN, R., GOLDING, B., **GRAY, M.W.**, LANG, B.F., LEMIEUX, C., SANKOFF, D. AND TURMEL, M. (1993) **7th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Banff, AB, Oct. 20-23.
The organelle genome sequencing project.
55. **GLOVER, K.E.** AND **GRAY, M.W.** (1994) **4th International Congress of Plant Molecular Biology**, Amsterdam, Netherlands, June 19-24.
The genetic origin of transfer RNAs in wheat mitochondria.
56. **GREENWOOD, S.J.**, SCHNARE, M.N. AND **GRAY, M.W.** (1994) **10th Biennial Meeting of the International Society for Evolutionary Protistology (ISEP-10)**, Dalhousie University, Halifax, NS, Aug. 4-10.
The U3 snoRNA of Euglena gracilis.
57. **GLOVER, K.** AND **GRAY, M.W.** (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
The genetic origin of tRNAs in wheat mitochondria.
58. **GREENWOOD, S.J.**, SCHNARE, M.N. AND **GRAY, M.W.** (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
The U3 snoRNA of Euglena gracilis.
59. **IKEDA, T.** AND **GRAY, M.W.** (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
Characterization of protein factors involved in transcription in wheat mitochondria.
60. **PRICE, D.** AND **GRAY, M.W.** (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
tRNA processing in the mitochondria of Acanthamoeba castellanii.

61. SMALLMAN, D. AND **GRAY, M.W.** (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
Probing the conformation of Euglena gracilis LSU rRNA.
62. IKEDA, T. AND **GRAY, M.W.** (1995) **Plant Mitochondria: From Gene to Function**, Duke University, Durham, NC, Apr. 7-12.
Characterization of protein factors involved in transcription in wheat mitochondria.
63. LITTLEJOHN, T.G., BURGER, G., **GRAY, M.W.**, KORAB-LASKOWASKA, M. AND LANG, B.F. (1995) **2nd Meeting on the Interconnection of Molecular Biology Databases (MIMBD-95)**, Cambridge University, England, July 20-22.
The organelle genome database project (GOBASE).
64. CERMAKIAN, N., IKEDA, T.M., CEDERGREN, R.J. AND **GRAY, M.W.** (1995) **9th Annual Meeting, Program in Evolutionary Biology**, Canadian Institute for Advanced Research, Val Morin, QC, Aug. 23-27.
Widespread distribution of T3/T7-type RNA polymerase genes in eukaryotes.
65. BURGER, G., CEDERGREN, R.J., GOLDING, B., **GRAY, M.W.**, LASKOWSKA, M., LANG, B.F., LEMIEUX, C., LITTLEJOHN, T.G., RIOUX, P., SANKOFF, D. AND TURMEL, M. (1996) **Annual Meeting of the Genetics Society of Canada**, University of Manitoba, Winnipeg, MB, June 12-15.
Bioinformatics projects of the organelle genome and database program.
66. KORAB-LASKOWASKA, M., RIOUX, P., LANG, B.F., BURGER, G., **GRAY, M.W.** AND LITTLEJOHN, T.G. (1996) 3rd Meeting on the Interconnection of Molecular Biology Databases (MIMBD-96), St. Louis, MO, June 12-15, 1996.
The organelle genome database project (GOBASE).
67. IKEDA, T.M. AND **GRAY, M.W.** (1996) **Gordon Research Conference on Mitochondria and Chloroplasts**, Plymouth State College, Plymouth, NH, June 16-21.
Characterization of a protein factor implicated in transcription in wheat mitochondria.
68. CERMAKIAN, N., IKEDA, T.M., **GRAY, M.W.** AND CEDERGREN, R. (1996) **Gordon Research Conference on Mitochondria and Chloroplasts**, Plymouth State College, Plymouth, NH, June 16-21.
Evolution and distribution of T7-type RNA polymerases in eukaryotes.
69. LITTLEJOHN, T.G., LANG, B.F., **GRAY, M.**, BURGER, G., KORAB-LASKOWSKA, M. AND RIOUX, P. (1997) **Conference on Organisation and Expression of the Genome**, Lorne, Victoria, Australia, Feb. 17-21.
GOBASE- The Organelle Genome Database Project.
70. BURGER, G., FARMER, M.A., **GRAY, M.W.**, LANG, B.F., NERAD, T.A. AND O'KELLY, C.J. (1997) **7th East Coast Conference on Protistology**, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI, May 21-23.
The jakobid and retortamonad flagellates: keys to understanding early events in mitochondrial eukaryote evolution.
71. LANG, B.F., BURGER, G., O'KELLY, C.J. AND **GRAY, M.W.** (1997) **10th International Congress on Protistology (ICOP-X)**, Sydney, Australia, July 21-25.
The mitochondrial DNA of Reclinomonas resembles a eubacterial genome in miniature.
72. IKEDA, T.M. AND **GRAY, M.W.** (1998) **International Congress on Plant Mitochondria: From Gene to Function (ICPM 98)**, Aronsborg, Sweden, June 22-27.
Biochemical characterization of the wheat mitochondrial transcription machinery.
73. EDQVIST, J., BURGER, G. AND **GRAY, M.W.** (1998) **International Congress on Plant Mitochondria: From Gene to Function (ICPM 98)**, Aronsborg, Sweden, June 22-27.
Mitochondrial gene expression in the ciliate Tetrahymena pyriformis.
74. WATANABE, Y.-I. AND **GRAY, M. W.** (1999) Fourth Annual Meeting of the RNA Society, University of Edinburgh, Scotland, June 23-27.
Cloning of the cDNA encoding Euglena gracilis fibrillarin.
75. IKEDA, T. M. AND **GRAY, M.W.** (1999) **XVI International Botanical Congress**, St. Louis, MO, Aug. 1-7.
Characterization of a DNA-binding protein implicated in transcription in wheat mitochondria.

76. CHARETTE, M., GREENWOOD, S.J., SCHNARE, M.N. AND **GRAY, M.W.** (2000) **14th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Digby Pines, Digby, NS, Oct. 11-15.
Organization of genes encoding U3 small nucleolar RNA in Euglena gracilis.
77. CHARETTE, M. AND **GRAY, M.W.** (2003) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 19-24.
Genes encoding U3 small nucleolar RNA are multi-copy and organized in a variety of contexts in Euglena gracilis.
78. RUSSELL, A.G., SCHNARE, M.N. AND **GRAY, M.W.** (2003) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 19-24.
Characterization of snoRNAs from Euglena gracilis.
79. LOHAN, A.J. AND **GRAY, M.W.** (2003) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 19-24.
Partial purification of a mitochondrial tRNA editing activity from Acanthamoeba castellanii.
80. LOHAN, A.J. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Partial purification of Acanthamoeba castellanii mitochondrial tRNA editing activity.
81. WATKINS, R.R. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Screening a Euglena gracilis EST library for lateral transfers.
82. SCHINDEL, E.T., LOHAN, A.J. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Editing of mitochondrial tRNAs in Polysphondylium pallidum.
83. SHUTT, T. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Evolution of the mitochondrial transcription apparatus.
84. BULLERWELL, C.E., SCHNARE, M.N. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Discovery and characterization of Acanthamoeba castellanii mitochondrial 5S ribosomal RNA.
85. BULLERWELL, C.E. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
tRNA editing in the mitochondria of Spizellomyces punctatus (Chytridiomycota).
86. CHARETTE, J.M. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Genes encoding U3 small nucleolar RNA are multi-copy and organized in a variety of contexts in Euglena gracilis.
87. WATKINS, R.F. AND **GRAY, M.W.** (2004) **NASA/CIAR Meeting on Lateral Gene Transfer and the Origins of Eukaryotes**, Harrison Hot Springs, BC.
Quantifying LGT frequency across a single eukaryotic phylum.
88. CHARETTE, J.M. AND **GRAY, M.W.** (2005) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 23-28.
Euglena gracilis U3 snoRNA genes are multi-copy and frequently linked to U5 snRNA genes.
89. BULLERWELL, C.E. AND **GRAY, M.W.** (2005) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 23-28.
tRNA editing in the mitochondria of a chytridiomycete fungus.
90. LOHAN, A.J. AND **GRAY, M.W.** (2005) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 23-28.
Purification status of Acanthamoeba castellanii mitochondrial tRNA editing activity.
91. LOHAN, A.J., SCHINDEL, E.T. AND **GRAY, M.W.** (2005) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 23-28.
Confirmation of 5'-terminal tRNA editing in the mitochondria of Polysphondylium pallidum.
92. SHUTT, T.E., RUSSELL, A.G., WATKINS, R.F. AND **GRAY, M.W.** (2005) **International Conference on Microbial Genomes**, Halifax, NS, Apr. 13-16.
An ancient intron and laterally transferred genes specifically unite three eukaryotic supergroups.

93. WATKINS, R.F. AND **GRAY, M.W.** (2005) **International Conference on Microbial Genomes**, Halifax, NS, Apr. 13-16.
Quantifying lateral gene transfer frequency across a single phylum.
94. PHILIPPE, H., BRINKMANN, H., RODRIGUEZ-EZPELETA, N., **GRAY, M.W.**, DERELLE, E., DELSUC, F. AND DOUZERY, E.J.P. (2005) **19th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Tigh-Na-Mara Resort, Parksville, BC, Sept. 15-19.
A new timescale for the evolution of eukaryotes inferred from a taxon-rich genome-scale dataset.
95. SHUTT, T.E. AND **GRAY, M.W.** (2005) **19th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Tigh-Na-Mara Resort, Parksville, BC, Sept. 15-19.
Twinkle, the mitochondrial replicative DNA helicase, is widespread in the eukaryotic radiation and may also be the mitochondrial primase in most eukaryotes.
96. SMITH, D.G.S., SPENCER, D.F., **GRAY, M.W.**, PEARLMAN, R.E. AND SIU, K.W.M. (2006) **54th ASMS Conference on Mass Spectrometry**, Washington State Convention Center, Seattle, WA, May 28-June 1.
Studies on the mitochondrial proteome of Tetrahymena thermophila using LC/LC-MS/MS.
97. GAWRYLUK, R.M.R., SMITH, D.G.S., SPENCER, D.F., PEARLMAN, R.E., SIU, K.W.M. AND **GRAY, M.W.** (2007) **FEBS Advanced Lecture Series, Mitochondria in Life, Death and Disease**, Aussois, France, April 25-29.
The mitochondrial energy cycle of the ciliate protozoan, Tetrahymena thermophila.
98. GAWRYLUK, R.M.R., SPENCER, D.F., SMITH, D.G.S., PEARLMAN, R.E., SIU, K.W.M. AND **GRAY, M.W.** (2007) **FEBS Advanced Lecture Series, Mitochondria in Life, Death and Disease**, Aussois, France, April 25-29.
An analysis of mitochondrial protein targeting and import in the ciliate protozoan, Tetrahymena thermophila.
99. GAWRYLUK, R.M.R., SMITH, D.G.S., SPENCER, D.F., PEARLMAN, R.E., SIU, K.W.M. AND **GRAY, M.W.** (2007) **Annual Meeting of the Society for Molecular Biology and Evolution (SMBE07)**, Dalhousie University, Halifax, NS, June 24-28.
The mitochondrial energy cycle of the ciliate protozoan, Tetrahymena thermophila.
100. ARCHIBALD, J.M., **GRAY, M.W.**, KEELING, P J., MCFADDEN, G.I. AND LANE, C.E. (2007). **Second Annual DOE Joint Genome Institute User Meeting**, Walnut Creek, CA, March 28-30.
Impact of secondary endosymbiosis on genome evolution and cell biology: A cryptomonad and a chlorarachniophyte nuclear genome.
101. **GAWRYLUK, R.M.R.**, SPENCER, D.F. AND **GRAY, M.W.** (2009) **Joint Symposium of German Academy of Sciences Leopoldina, SFB 429 and SFB-TR1, Molecular Genetics of Chloroplasts and Mitochondria**, Free University of Berlin, Berlin, Germany, September 20-23.
A proteomic investigation of the electron transport chain of Acanthamoeba castellanii mitochondria.