Curriculum Vitae of Murugesapillai Maheswaran

A. PERSONAL DETAILS

Present Position: Emeritus Professor of Mathematics
Address: Department of Mathematics,
University of Wisconsin Stevens Point at Wausau,
518 South 7th Avenue, Wausau, Wisconsin 54401-5396.
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B. PROFESSIONAL EXPERIENCE

Substantive Positions:

Department of Mathematics, University of Ceylon (now the University of Peradeniya), Sri Lanka
- Assistant Lecturer in Mathematics — Jun 1962 to Aug 1964
- Lecturer in Mathematics — Aug 1968 to Aug 1974
- Senior Lecturer in Mathematics — Sep 1974 to Mar 1976
- Professor of Mathematics — Mar 1976 to Sep 1985

Department of Mathematics, Southern Illinois University, Carbondale, IL.
- Visiting Lecturer in Mathematics — Sep 1985 to Aug 1986

Department of Mathematics, University of Wisconsin Marathon County, Wausau, WI.
- Visiting Associate Professor of Mathematics — Aug 1986 to Jul 1988
- Associate Professor of Mathematics — Aug 1988 to Jun 1992
- Professor of Mathematics — Jul 1992 to May 2007
- Emeritus Professor of Mathematics — May 2007 to present

Sabbatical Leave and Summer Positions:

Research Fellow, Universite de Liege, Belgium — Dec 1973 to Sep 1974
Visiting Professor, University of Port Harcourt, Nigeria — Dec 1981 to Mar 1983
Visiting Associate Professor, University of Wisconsin - Madison — Jun 1987 to Aug 1987
Visiting Associate Professor, University of Wisconsin - Madison — Jun 1990 to Aug 1990
Visiting Professor, University of Wisconsin - Madison — Jun 1995 to Aug 1995

Additional Concurrent Positions:

Head, Mathematics Department, University of Peradeniya, Sri Lanka — Sep 1974 to Jan 1978
Visiting Professor of Engineering Mathematics, Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka — Oct 1977 to Dec 1981
Acting Dean, School of Physical Sciences, University of Port Harcourt, Nigeria — Aug 1982 to Oct 1982
Senior Consultant in Applied Mathematics, Open University of Sri Lanka — Jan 1984 to Sep 1985
Senior Fellow and Coordinator in Astronomy and Mathematics, Institute of Fundamental Studies, Sri Lanka — Jul 1984 to Sep 1985
Associate Chair, Department of Mathematics, University of Wisconsin-Marathon County, Wausau, Wisconsin — Feb 1989 to Aug 2002

Areas of Teaching Experience:

Differential Equations; Linear Algebra; Numerical Analysis; Mathematical Methods; College Mathematics (Freshman and Sophomore Courses in Algebra, Calculus, Geometry, Finite Mathematics, Trigonometry, etc.), Spherical Trigonometry. Computer Programming; Theoretical Electromagnetism, Fluid Mechanics and Classical Mechanics; Magnetohydrodynamics.

Areas of Research Experience:

Mathematical Astrophysics: (i) Stellar Rotation and Magnetism; (ii) Winds and Disks of Massive Stars; (iii) Stellar Magnetohydrodynamics.
Chemical Thermodynamics: Analysis of Multicomponent Mixtures and Solutions.
Applied Mathematics: Non-geodesic Trajectories on Mandrel Surfaces.

Other Areas of Academic Experience and Interests:

Hypertext and Hypermedia Materials in Instruction; Virtual Textbooks.

C. EDUCATION

***Undergraduate*:** University of Ceylon (Sri Lanka) - 1958 to 1962
Degree: B.Sc., 1962 - First Class Honors in Mathematics
Awards: 1. University of Ceylon Exhibitioner, 1959 to 1962
2. Scholarship for the Most Meritorious Performance in Mathematics among Science Graduates in the Universities in Sri Lanka, 1962

***Postgraduate*:** University of Cambridge, England - 1964 to 1968
Degree: Ph.D., 1968 - Mathematical Astrophysics
Awards: Ceylon Government University Scholarship, 1964 to 1967

Advanced Study Programs, Specialized Courses and Research Seminars:

1. "Autumn School on Mathematical and Numerical Methods in Fluid Dynamics", International Centre for Theoretical Physics, Trieste, Italy, Fall (Sep to Dec) 1973.
2. Course on "Computational Methods in the Physical Sciences",Institut de Recherche d'Informatique et d'Automatique, Paris, France, Dec 1973.
3. Fourth Advanced Saas-Fee Course on "Magnetohydrodynamics", Swiss Association for Astronomy and Astrophysics, Saas-Fee, Valais, Switzerland, Apr 1974.
4. Course on "Applications of Analysis to Mechanics", International Centre for Theoretical Physics, Trieste, Italy, Fall (Sep to Dec) 1976.
5. College on "Theoretical and Computational Plasma Physics", International Centre for Theoretical Physics, Trieste, Italy, Mar/Apr 1977.
6. "Autumn College on Plasma Physics", International Centre for Theoretical Physics, Trieste, Italy, Fall (Oct/Nov) 1979.

D. RESEARCH AND PUBLICATIONS

Ph.D. Thesis:

Rotation, Circulation and Magnetic Fields in Stars - M. Maheswaran,
Department of Applied Mathematics and Theoretical Physics, University of Cambridge, England.

Research Papers and Abstracts:

1. On Meridian Circulation - M. Maheswaran, Mon. Not. Royal Astron. Soc., 140, p 93, 1968.
2. Effects of Prescribed Circulations on Magnetic Fields - M. Maheswaran, Mon. Not. Royal Astron. Soc., 145, p 197, 1969.
3. Rotation and Meridian Circulation in Non Magnetic Stars - M. Maheswaran, Proc. Ceylon Assn. for Advancement of Science, XXV (part A), 1969. *(Abstract)*
4. Analysis of a Science Faculty Course Survey - M. Maheswaran, Proc. Ceylon Assn. for Advancement of Science, XXVI (part A), 1970. *(Abstract)*
5. A Survey of the Background and Interests of Students in a Science Faculty - M. Maheswaran, Journal of the National Education Society of Ceylon, XXI, p 20, 1972.
6. Magnetic Fields in Rapidly Rotating Stars - M. Maheswaran and H. A. B. M. de Silva, Mon. Not. Royal Astron. Soc., 162, p 289, 1973.

7. On the Magnetic Fields of Upper Main Sequence Stars - M. Maheswaran, Astronomy and Astrophysics, 37, p 169, 1974.
8. Spin Down of Pulsars - G. Chanmugam and M. Maheswaran, Publ. Astron. Soc of Japan, 27, p 307, 1975.
9. Conditions for Steady Circulation in Rotating Magnetic Stars with Finite Electrical Conductivity – M. Maheswaran, Journ. Nat. Science Council of Sri Lanka, 3(1), p 11, 1975.
10. On Steady Rotation of Stars - M. Maheswaran, Journ. Nat. Science Council of Sri Lanka, 3(2), p 73, 1975. *(Abstract)*
11. Circulations and Fossil Magnetic Fields in Rotating Stars - M. Maheswaran, Memoires de la Societe Royale des Sciences de Liege, tome VI, 6e serie, p 107, 1975. *(Abstract)*
12. The Gibbs-Duhem Equation and Ideal Mixtures - S. G. Canagaratna and M. Maheswaran, Proc. Sri Lanka Assn. for Advancement of Science, 35 (part 1), 1979.
13. Internal Magnetic Fields of White Dwarf Stars - G. Chanmugam and M. Maheswaran, Journ. Nat. Science Council of Sri Lanka, 7(2), p 75, 1979.
14. Determination of Partial Molar Quantities in Multicomponent Systems - S. G. Canagaratna and M. Maheswaran, J. Chem. Soc., Faraday 2, 76, p 1119, 1980.
15. Activity Coefficients in Mixed Electrolyte Solutions - S. G. Canagaratna and M. Maheswaran, Proc. Sri Lanka Assn. for Advancement of Science, 37 (part 1), 1981. *(Abstract)*
16. Activity Coefficients and the Solvation Effect- S. G. Canagaratna and M. Maheswaran, Proc. Sri Lanka Assn. for Advancement of Science, 37 (part 1), 1981. *(Abstract)*
17. On Solution-Vapour Equilibria in Multicomponent Systems - S. G. Canagaratna and M. Maheswaran, Proc. Sri Lanka Assn. for Advancement of Science, 39 (part 1), 1983. *(Abstract)*
18. Determination of Mean Molar and Molar Excess Quantities in Multicomponent Systems – S. G. Canagaratna and M. Maheswaran, J. Chem. Soc., Faraday 2, 80, p 261, 1984.
19. On Solutions of curl a = ka and Force-Free Magnetic Fields - M. Maheswaran, J. Phys. A: Math. Gen., 19, L761, 1986.
20. Fast Magnetic Rotators with Stellar Winds: Interior Constraints - M. Maheswaran and J. P. Cassinelli, Bull. American Astron. Soc., 19 (4), p 1024, 1987. *(Abstract)*
21. The Equation curl B = kB and Magnetic Fields - M. Maheswaran, J. Phys. A: Math. Gen., 20, L195, 1987.
22. On the Surface Magnetic Fields of Rapidly Rotating Stars with Winds - M. Maheswaran and J. P. Cassinelli, Astrophys. J., 335, p 931, 1988.
23. Effects of Steady Circulation on Magnetic Fields - M. Maheswaran, Bull. American Astron. Soc., 21 (2), p 745, 1989. *(Abstract)*
24. Evolution of Rotation in Hot Stars with Winds, from ZAMS through Wolf-Rayet Stage – M. Maheswaran and J. P. Cassinelli, Bull. Amer. Astron. Soc., 22(4), p 1206, 1990. *(Abstract)*
25. Constraints on the Surface Magnetic Fields of Hot Stars with Winds - M. Maheswaran and J. P. Cassinelli, Astrophys. J., 386, p 695, 1992.
26. Some Aspects of Rotation and Magnetic Fields during Massive Star Evolution - M. Maheswaran, Bull. Amer. Astron. Soc., 25(2), p 870, 1993. *(Abstract)*
27. Evolution of Magnetic Fields with Mixed Polarity under the Action of Steady Circulation – M. Maheswaran, Bull. Amer. Astron. Soc., 26(2), p 949, 1994. *(Abstract)*
28. Rotation and Magnetic Fields during the Evolution of Massive Stars through B[e] and Wolf-Rayet Phases - M. Maheswaran and J. P. Cassinelli, Astrophys. Journ. 421, p 718,1994.
29. Meridional Circulation in Radiative Diffusion Zones of Rotating Stars - M. Maheswaran, Bull. Amer. Astron. Soc., 27(2), p 839, 1995. *(Abstract)*
30. Stagnation Zones in the Atmospheres of Hot Stars with Rotation and Magnetic Fields – M. Maheswaran, Bull. Amer. Astron. Soc., 28(2), p 943, 1996. *(Abstract)*
31. Non-geodesic Filament Winding on Mandrel Surfaces - A Differential Equations Approach to Generating Trajectories - M. Maheswaran, A paper based on research work carried out for McClean Anderson Division of ISAMI - 1997
32. Non-geodesic Paths with Specified Boundary Conditions on Surfaces of Revolution – M. Maheswaran, Mathematical Association of America -- Wisconsin Section, Spring 1998.
33. A Magnetically Torqued Disk Model for Be Stars – J. P. Cassinelli, J. C. Brown, M. Maheswaran, N. A. Miller and D. C. Telfer, Astrophys. Journ., 578, p 951, 2002.

34. Magnetic Rotator Winds and Keplerian Disks in Hot Stars – M. Maheswaran, Astrophys. Journ. 592, 2003.
35. Magnetic Fields and Be Disk Formation – M. Maheswaran paper presented at the Workshop on *Massive Stars: From Photospheres to V-infinity* held at UW Madison on September 17th and 18th, 2004.
36. A Magnetic Rotator Wind-Disk Model for Be Stars – M. Maheswaran, ASP Conf. Ser. vol. 337, The Nature and Evolution of Disks around Hot Stars, ed. R. Ignace & K. Gayley (San Francisco: ASP), 2005.
37. Magnetically Fed Hot Star Keplerian Disks with Slow Outflow - J. C. Brown, J. P. Cassinelli and M. Maheswaran, Astrophys. Journ. 688, p1320, 2008.
38. Protodiscs around Hot Magnetic Rotator Stars – M. Maheswaran and J. P. Cassinelli, Mon. Not. Royal Astron. Soc. 394, p415, 2009.
39. Equations for the Evaluation of Thermodynamic Quantities for Multicomponent Systems – S. G. Canagaratna and M. Maheswaran, Journal of Chemical & Engineering Data, 56(6), p 2761, 2011.
40. Thermodynamics on the Molality Scale – S. G. Canagaratna and M. Maheswaran, Journal of Chemical Education, 90(5), p598, 2013 - online Feb 7, 2013 (Article)

Books and Texts:

1. Lessons in Numerical Analysis - M. Maheswaran, 1981, Open University of Sri Lanka.
2. A Virtual Textbook of College Algebra - M. Maheswaran, 1996-2008.
3. Brief College Algebra – M. Maheswaran and Paul A. Martin, 2009.
4. Equations for Rotating Magnetic Stars, their Winds and Circumstellar Disks – M. Maheswaran, 2017, Researchgate Book.
5. Equations for Molar Quantities in Multicomponent Mixtures and Solutions – M. Maheswaran, 2021, Researchgate Book.

Directories, Catalogs

1. A Catalog of Resources in Mathematics on the World Wide Web and the Internet – M. Maheswaran, published electronically on the World Wide Web, 1994-2014. URL: http://www.uwc.edu/depts/math/resources/catalog

Technical Articles, Documents:

1. Modern Mathematics in Ceylon - M. Maheswaran, Journal of the National Education Society of Ceylon, XIX, 1970.

Presentations:

Made many presentations of research work and reviews of research at professional meetings, colloquia and seminars. Areas of presentations include the following: (i) Mathematical modeling of phenomena associated with rotation, circulation, magnetic fields, winds and disks in hot stars; (ii) Non-geodesic filament winding on mandrel surfaces; (iii) Use of Hypermedia Materials in Instruction and Virtual Textbooks.

E. FELLOWSHIPS, GRANTS, AWARDS

1. Research Fellowship, Universite de Liege, Belgium, 1973/74.
2. IAEA/ICTP Grant to participate in advanced course and research seminars in applied mathematics at the International Centre for Theoretical Physics, Trieste, Italy, 1973 Fall Semester.
3. IAEA/ICTP Grant (as above) at the ICTP, Trieste, Italy 1976 Fall Semester.
4. IAEA/ICTP Grant (as above) at the ICTP, Trieste, Italy for 3 weeks in 1977.
5. IAEA/ICTP Grant (as above) at the ICTP, Trieste, 1979 Fall Semester.
6. Visiting Professorship in Mathematics, University of Port Harcourt, Port Harcourt, Nigeria, 1982/83
7. Senior Fellowship, Institute of Fundamental Studies, Sri Lanka, 1984/85.
8. Associate Membership, International Centre for Theoretical Physics, Trieste, Italy, 1985-90.
9. University of Wisconsin-Madison / University of Wisconsin Centers Research Grant 1987.
10. University of Wisconsin Centers Summer Research Grant 1988.

11. AAS/NASA Small Research Grant 1988, funded by NASA and administered by the AAS.
12. University of Wisconsin-Madison / UW Centers Summer Research Grant 1990.
13. University of Wisconsin Centers Award for Teaching Excellence, 1991/92.
14. University of Wisconsin Centers Summer Research Grant 1992.
15. NSF Research Grant 1992-1996, with J. P. Cassinelli, at University of Wisconsin - Madison.
16. UWMC Foundation Summer Research Grant 1993.
17. UWMC Foundation Summer Research Grant 1994.
18. University of Wisconsin Centers Faculty Sabbatical Leave, Spring Semester 1995.
19. University of Wisconsin-Madison / UW Centers Summer Research Grant, 1995.
20. UWMC Foundation Summer Research Grant 1996.
21. UWMC Foundation Summer Research Grant 1998.
22. Arthur M. Kaplan Fellow, University of Wisconsin Colleges, 1998/99
23. UWMC Foundation Summer Research Grant 1999.
24. UWMC Foundation Summer Research Grant 2000.
25. UWMC Foundation Summer Research Grant 2001.
26. UWMC Foundation Summer Research Grant 2002.
27. UW Colleges Faculty Sabbatical Leave, Spring 2003.
28. UWMC Foundation Summer Research Grant 2003.
29. Barrington-Musolf Faculty Research Award 2003 for the most outstanding research published by a UW Colleges faculty member in 2002/2003.
30. AAS/NASA Small Research Grant 2003 funded by NASA and administered by the AAS.
31. UWMC Foundation Summer Research Grant 2004.
32. UWMC Foundation Summer Research Grant 2005.
33. UWMC Foundation Summer Research Grant 2006.

F. PROFESSIONAL SOCIETIES, SERVICE

Current Membership in Professional Associations:

American Astronomical Society
International Astronomical Union
Sri Lanka Association for the Advancement of Science
Astronomical Society of India

Professional Service:

1. Referee for research articles in Applied Mathematics, Mathematical Physics and Astronomy for several journals, 1968 to 2004.
2. Member (University Nominee), National Committee on Translation of High School Mathematics Text Books into Sinhala and Tamil Languages, Sri Lanka Educational Publications Department, 1971.
3. Member (University Nominee), National Committee set up to formulate syllabi in Mathematics for Grades 10 and 11 in High Schools, in Sri Lanka, 1974/75.
4. External Examiner in Mathematics at several Universities in Sri Lanka 1974 to 1985.
5. Chair or member of organizing committees of several workshops and seminars in Mathematics, Physical Sciences and Instruction using hypermedia materials, 1968 to present.
6. Member of an ad hoc Committee to report to the American Astronomical Society on the Role of Professional Societies in Science, Technology, Engineering and Mathematics Education in Two-year colleges, 1992/93.
7. Participated in the initial discussions for the creation of the Wisconsin Webfair by the UW-System and served as a judge from 1995 to 2000.
8. Reviewed several textbooks in mathematics at college level and submitted reports to book publishers, 1997 to2000.
9. External referee to evaluate the promotion and tenure dossier of a mathematics assistant professor at Indiana University East, October 1998.
10. Webmaster, Wisconsin Mathematical Association of Two-Year Colleges, 1999 to present. Set up website and created web pages for the Association.

11. Participated in the Gear-Up 2000 project for talented high and middle school student by teaching special classes during Summer 2000.
12. Reviewed (honorary work) a research proposal for a grant under the Cooperative Grants Program for collaborative research between the US and the former Soviet Union. The program is administered by the U. S. Civilian Research and Development Foundation. Report was submitted in August 2001.

Popular Articles and Talks:

1. Gave talks on various topics in Mathematics and Astronomy to several societies, clubs and organizations 1968 to present.
2. Participated in the Popularization of Science Program of the Sri Lanka Association for the Advancement of Science, by giving several talks on national radio in Sri Lanka, 1972.
3. Participated as Moderator of Science Digest program conducted over radio by the Sri Lanka Broadcasting Corporation in 1985.
6. Organized the Math Awareness Week Programs at University of Wisconsin Centers in 1991 and 1992 -- gave popular talks on chaos and fractals.
7. *Fractals and Self-Similarity* – M. Maheswaran. -- a general article. It was published electronically at http://mthwww.uwc.edu/wwwmahes/fractals/index.htm and was also used in the Gear-Up 2000 classes.

G. UNIVERSITY SERVICE

Governance, Committees, etc. :

1. Chair or Member of a large number of standing, ad hoc and search committees at Departmental level, at Faculty/Division/Campus level and at Senate level, at the University of Peradeniya (Sri Lanka), the University of Port Harcourt (Nigeria) and the University of Wisconsin Marathon County (USA), during the period from 1968 to 2007
2. Member of the Senate, University of Peradeniya, Sri Lanka, 1974 to 1981, and 1985.
3. Member, External Examinations Board, University of Peradeniya, Sri Lanka, 1979 to 1985.
4. Member (Representing the Senate) of the Governing Council of the University of Peradeniya, Sri Lanka, 1980/81.
5. Member of the Senate, University of Port Harcourt, Nigeria, 1982/83.
6. Member of Planning Council, University of Wisconsin Centers (statewide), Nov 1989 to Feb1990.
7. UWMC MTHWWW World Wide Web Server Administrator, May 1994 to present.
   Set up the WMC World Wide Web Server in May 1994 as an archive for educational materials in all subject areas for students, faculty and staff at universities and, also, created a large number of course related hypermedia materials and references. Continued to update, enhance and add new materials,1994 to present.

Other University Service:

University of Peradeniya, Sri Lanka

1. Student Advisor, 1972 to 1977
2. Sports Advisory Board - Member 1976 to 1979, Chair 1984/85
3. Rugby Football Coach (Honorary), 1969 to 1985

University of Wisconsin Marathon County

1. Organized and conducted several workshops on the World Wide Web and the creation of web pages, for faculty, staff and the community, 1994 to present.
2. Student Mentor, 1996/97

H. SPORTS

1. Represented the University of Ceylon in Rugby Football 1959 to 1962 and was awarded University Colours in 1960, 1961 and 1962.
2. Represented Churchill College, Cambridge, in Rugby Football 1965 to 1967 and was awarded College Colours in 1966/67