CURRICULUM VITAE

W. EUGENE COUCH

October, 2007

PERSONAL DATA:

Present Address: Department of Mathematics and Statistics
The University of Calgary
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Date of Birth: 28 February 1938

Place of Birth: Dallas, Texas, U.S.A.

Citizenship: Canadian

EDUCATION:

Ph.D. Physics	1966	University of Pittsburgh, Pittsburgh, PA
B.S. Physics	1960	Abilene Christian University, Abilene, TX

ACADEMIC POSITIONS AND EXPERIENCE

1988-Present	Professor, Department of Mathematics and Statistics, The University of Calgary. Teaching and Research.
1979-88	Associate Professor, Department of Mathematics and Statistics, The University of Calgary. Teaching and Research
1976-79	Assistant Professor, Department of Mathematics and Statistics, The University of Calgary. Teaching and Research
1974-76	Research Associate, Department of Mathematics and Statistics, The University of Calgary. Teaching (part-time) and research.
1973-74	Visiting Lecturer, Department of Physics, Towson State University, Baltimore, MD. Teaching and Research
1972-73	Visiting Assistant Professor, Department of Physics, University of Cincinnati. Teaching and Research.

1970-72	Research Associate, Department of Physics, University of Pittsburgh. Teaching (part-time) and research.
1968-70	Faculty Associate, Department of Physics, Center for Relativity Theory, University of Texas. Teaching (part-time) and research.
1966-68	Research Associate, Department of Physics, Syracuse University. Teaching (part-time) and research.
1963-66	Research Assistant, Department of Physics, University of Pittsburgh. Ph.D. Thesis research.
1965	Faculty, University School, Pittsburgh, PA. Part-time teaching of high school mathematics.
1962-63	Andew Mellon Fellow, University of Pittsburgh. Graduate course work.
1961-62	Andrew Mellon Fellow, University of Pittsburgh, Graduate course work.
1961 Summer	U.S. Steel, Bain Fundamental Research Laboratory, Monroeville, PA. Experimental research on internal friction in metals.
1960-61	Teaching Assistant, Department of Physics, University of Pittsburgh. Physics laboratory and recitation sections.

Research Grants

Agency	**Dates**	**Amount**	**Title**
NSERC	1997-2001	$30,100	Solvable Differential Equations, Lattices, and General Relativity
NSERC	1994-97	$24,000	Solvable Differential Equations, Lattices, and General Relativity
NSERC	1993-94	$6,000	Radiation in Gravitational Fields
NSERC	1993-95	$9,203	Equipment Grant
NSERC	1992-93	$9,000	Radiation in Gravitational Fields
NSERC	1989-92	$27,744	Radiation in Gravitational Fields
NSERC	1986-89	$16,500	Radiation in Gravitational Fields
NSERC	1983-86	$6,572	Radiation in Gravitational Fields
SEED	1985	$2,003	Mathematical Physics
Career Access	1984	$1,200	Undergraduate Summer Research in Pure and Applied Mathematics
NSERC	1980-83	$6,400	Radiation in Gravitational Fields
NSERC	1977-80	$5,576	Radiation in Gravitational Fields
Towson State University	1973-74	$458	Generalized Bremmer Series for Wave Equations Self-Interaction of Gravitational Radiation. Exact Solutions in General Relativity
NSF	1968-70	$6,000	Nonlinear Interactions of Gravitational Radiation
University of Texas	1970	$1,600	Nonlinear Interactions of Gravitational Radiation

Postdoctoral Supervision

V. Husain	1994-1995
L. Bombelli	1990-1992

Graduate Student Supervision

Student	**Degree**	**Date Received**	**Duration of Supervision**	**Thesis Title**
C. Holder	M.Sc.	2007	Sept. 2006 - Aug 07	The Liouvillian Perturbations of the Kerr-Newman Black Hole
T. Rapke	M.Sc.	2006	Sept. 03 - July 06	Coursework degree
G. D-Vidovic	Ph.D.	2004	Sept. 02 - July 04	Portfolio Optimization Under Downside Risk Measures
M. Surovy	M.Sc.	1998	Sept. 96 - 98	Matrix Kundt-Newman Sequences
S. Wang	M.Sc.	1988	Sept. 86-88	Equivalence Problem for Nonscattering Spacetimes
T. Kaip	M.Sc.	1986	Jan. 85-Sept. 86	Coursework degree
T. Sartorelli	M.Sc.	none	Jan. 85-Aug.87	Coursework degree
B. Dayton	M.Sc.	1985	Sept. 84-Sept. 85	Coursework degree
D. Colvin	M.Sc.	1978	Mar. 76-Feb. 78	Seismic Waves in Permafrost

Undergraduate Student Supervision

Student:	**Grant:**	**Date:**	**Research Project:**
C. Holder	Summer NSERC -	2005	Quasi-normal Modes of Black Holes
B. Wards	Summer NSERC -	2002	Relation of Kundt-Newman Sequence to Super Symmetric Quantum Mechanics
M. Vasudevan	Summer NSERC -	2001	Quasi-normal Modes of Black Holes
M. Vasudevan	Summer NSERC -	2000	Matrix Wave Equations
J. Jakubowski	Summer NSERC -	1994	Kundt-Newman Sequence and Classification of Differential Equations
J. Jakubowski	Summer NSERC -	1993	Kundt-Newman Sequence and Classification of Differential Equations
L. Pacarynuk	Summer NSERC -	1993	Kundt-Newman Sequence and Classification of Differential Equations
L. Pacarynuk	Summer NSERC -	1992	Differential Equations and Algebraic Computing
S. Desjardins	Summer NSERC -	1987	Progressive Waves and Spin-S Fields
C. Heisler	Summer NSERC -	1985	Nonscattering Potentials
B. Sanders	Summer NSERC -	1984	Computer Program for Newman-Penrose Formalism
C. Heisler	Summer NSERC -	1984	Nonscattering Potentials
B. Sanders	Summer NSERC -	1983	Comparison of Approximation Schemes for Wave Equations
J. Rich	Summer NSERC -	1980	Comparison of Approximation Schemes for Wave Equations

Supervisory and Graduate Examination Committees:

- Ph.D. Candidacy Examination, A. Msterson
  Physics 2006
- Ph.D. Candidacy Examination, G. Boucher
  Mathematics and Statistics 2005
- Ph.D. Candidacy Examination, J. Kollar
  Physics April, 2004 and Oct. 2004
- Ph.D. Thesis Oral Examination Committee, Jo-Anne Brown
  Physics 2002

- Ph.D. Thesis Oral Examination Committee, P. Webster
  Physics 1999
- M.Sc. Thesis Oral Examination Committee - J. Gomez
  Physics 1998
- Ph.D. Candidacy Examination - P. Gibson. Mathematics and
  Statistics May, 1997
- Ph.D. Candidacy Examination - P. Zizler. Mathematics and
  Statistics . Nov. 1994
- Ph.D. Supervisory Committee - J. Pinter. Mathematics and
  Statistics . 1993
- M.Sc. Thesis Oral Examination Committee - S. Desjardins,
  Mathematics and Statistics. Sept. 1990
- M.Sc. Thesis Oral Examination Committee - C.R.M. Marshall,
  Physics. May 1990
- Ph.D. Candidacy Examination - J. Ling, Mathematics and
  Statistics. May 1988
- Ph.D. Thesis Oral Examination Committee - J. Simandl, Chemical
  Engineering. Feb. 1988
- Ph.D. Supervisory Committee - L. Barkwell, Mathematics and
  Statistics. May 1987
- Ph.D. Candidacy Examination - W. Nelson, Mathematics and
  Statistics. Dec. 1986
- Ph.D. Thesis Oral Examination Committee - D. Hearn,
  Geophysics. Nov. 1985
- M.Sc. Thesis Oral Examination Committee - S. Ritchie,
  Mathematics and Statistics. August 1978
- M.Sc. Thesis Oral Examination Committee - M. Weiss,
  Physics. August, 1977

- Ph.D. Thesis Oral Examination Committee - P. Ramamoorthy, Electrical Engineering. May 1977
- Set and marked Ph.D. written preliminary examinations 1986 (twice), 1991, 1993, 1994

Service
Major Areas of Service:

1. (1986-87)

   I carried out a year-long project with a budget of $50,000 to investigate computer assisted learning for the Department of Mathematics and Statistics. This involved investigation of CAL systems at several conferences and universities, evaluation of commercially available software and hardware, the teaching of a pilot course on the U. of C. Plato system, writing a 35 page report, and serving as a consultant both inside and outside the university.

2. (1983-86)

   Chairman,Division of Applied Mathematics, 1^{st} term.

   This included setting the agenda and chairing divisional meetings and three divisional committees, handling the correspondence of the division, membership on the departmental executive committee, implementation of decisions of the division, and student counselling.

3. (1986-89)

   Chairman, Division of Applied Mathematics, 2^{nd} term.

4. (1978-1993)

   Departmental Budget Officer for Department of Mathematics and Statistics account with Academic Computer Services.

5. (1982-89, 1990-94, 1995 - 2001, 2003-present)

   Member, Executive Committee, Department of Mathematics and Statistics.

6. (1993-94)

   Acting Chairman, Division of Applied Mathematics.

7. (1995-1998)

   Chairman, Division of Applied Mathematics, 3^{rd} term.

8. (1998-2001)

   Chairman, Division of Applied Mathematics, 4^{th} term.

9. (2000)

   I organized (with Prof. D. Hobill, Physics Department) a successful 4-day conference on Financial Mathematics held at the University of Calgary May 8–11, 2000. The featured speaker was Prof. Lane Hughston.

10. (2001)

    For the University of Calgary Curriculum Redesign project I wrote the 30-page Applied Mathematics Explicit Syllabus document and presented it to the Academic Programs Committee. The document was approved on the committee's first reading.

11. (2001–2004)

    Member of the Faculty of Graduate Studies Scholarship Committee and several of its subcommittees.

12. (2004-2008)

    Undergraduate Director, Department of Mathematics and Statistics

13. (2005-2006)

    Member of Department of Mathematics and Statistics Unit Review Committee. I wrote the major portion of the chapter eneitlted *Undergraduate Program* in the Unit Review Final Report.

14. (2006-2008)

    Chairman, Education Committee of the Department of Mathematics and Statistics.

15. (1993-2001, 2003-2006)
    Course Coordinator for Math 251 and Math 249.

Extra-departmental Activities and Committee Membership:

- Alberta Committee on Admissions and Transfer 2006-present
- University Transfer Committee 1995-2001
- Faculty of Engineering Accreditation Review 1997, 1999
- Executive Committee - Faculty of Science 1982-84, 2002-2004
- Physics Department Headship Selection Committee 1980-81
- GFC Student Appeals Committee 1979-81
- Joint AMAT/Engineering Curriculum Committee 1982
- Faculty of Engineering Accreditation Review 1981
- Joint AMAT/Engineering Faculty Committee 1978
- Joint AMAT/Chemical Engineering Committee 1978
- Local Organizing Committee of Canadian Mathematical Congress - Global Analysis Conference - U. of C. 1978

Departmental Activities and Committee Membership:

- Department of Mathematics and Statistics 2003-present
  Executive Committee 1995-2001
  1990-94
  1982-89
- Department of Mathematics and Statistics
  Appointments Committee 1999-2001
- Liaison with Faculty of Engineering 1995-2001

- PMAT/AMAT Rationalization Committee — 1996
- Core Curriculum Committee (non-voting advisor) — 1986-87
- Curriculum Committee - AMAT Division — 1979-present
- Graduate Studies Committee - AMAT Division — 1995-2001, 1983-89
- New Appointments Committee - AMAT Division — 1996-97, 1983-89, 1976-78
- Acting Head of the Department of Mathematics and Statistics — Several occasions
- Library Coordinator - AMAT Division — 1979-81
- Minutes Secretary - AMAT Division — 1978-80
- Joint AMAT/Engineering Committee on Engineering tutorial classes offered by the Faculty of Science — Oct., 1975

1. Couch, W.E. and J.C. Swartz, *The Dilatation of Dislocation Kinks and Jogs,* Phil. Mag. 7, 1231-1238(1962).

2. Newman, E.T., Couch, E., Chinnapared, K., Exton, A., Prakash, A. and Torrence, R.J., *Metric of a Rotating Charged Mass,* J. Math. Phys. 6, 918-919 (1965).

3. Couch, W.E., Torrence, R.J., Janis, A.I. and Newman, E.T., *Tail of a Gravitational Wave,* J. Math. Phys. 9, 484-496 (1968),

4. Couch, W.E. and Torrence, R.J., *The Self-Interaction of Gravitational Radiation*, J. Math. Phys. 11, 2096-2114 (1970).

5. Couch, W.E., Kinnersley, W.M. and Torrence, R.J., *Nonlinear Radiative Interactions in General Relativitiy,* Phys. Letters 31A, 576-577 (1970).

6. Couch, W.E. and Halliday, W.H., *Radiation Scattering in Einstein-Maxwell Theory,* J. Math. Phys. 12, 2170-2175 (1971).

7. Couch, W.E. and Torrence, R.J., *Asymptotic Behavior of Vacuum Spacetimes,* J. Math. Phys. 13, 69-73 (1972).

8. Couch, W.E. and Newman, E.T., *Generalized Lienard-Wiechert Fields*, J. Math, Phys. 13, 929-931 (1972).

9. Couch, W.E. and Newman, E.T., *Algebraically Special perturbations of the Schwarzschild Metric,* J. Math. Phys. 14, 285-286 (1973).

10. Couch, W.E. and Torrence, R.J., *Nonspreading Solutions to the Inhomogeneous Wave Equation,* J. Math. Phys. 16, 857-861 (1975).

11. Couch, W.E. and Torrence, R.J., *Retarded Multipole Fields and the Inhomogeneous Wave Equation,* J. Math. Phys. 16, 2375-2377 (1975).

12. Couch, W.E. and Torrence, R.J., *A Bremmer Series for Radial Wave Equations,* Can. J. Phys. 55, 2150-2157 (1977).

13. Couch, W.E. and Torrence, R.J., *An Approximation Scheme for Scalar Waves in a Schwarzchild Geometry,* Gen. Rel. Grav. 9, 1119-1128 (1978).

14. Couch, W.E. and Torrence, R.J., *An Approximation Scheme for Scalar Waves in a Reissner-Nordstrom Geometry,* Gen. Rel. Grav. 11, 71-77 (1979).

15. Couch, W.E. and Torrence, R.J., *A Particular N-soliton Solution and Scalar Wave Equations,* J. Math. Phys. 20, 2433-2426 (1979).

16. Couch, W.E., *An approximation Scheme for Scalar Waves in a Kerr Geometry,* Gen. Rel. Grav. 12, 665-673 (1980).

17. Couch, W.E., *Solutions to Wave Equations on Black Hole Geometries,* J. Math. Phys. 22, 1457-1462 (1981).

18. Torrence, R.J. and Couch, W.E., *Generating Fields from Data on* $H^- \cup H^+$ *and* $H^- \cup I^-$, Gen. Rel. Grav. 16, 847-866 (1984).

19. Couch, W.E. and Torrence, R.J., *Conformal Invariance Under Spatial Inversion of Extreme Reissner-Nordstrom Black Holes,* Gen. Rel. Grav. 16, 789-792 (1984).

20. Torrence, R.J. and Couch, W.E., *Transparency of de Sitter and anti-de Sitter Space-times to Multipole Fields,* Class. Quantum Grav. 2, 545-553 (1985).

21. Couch, W.E., *Solutions to Wave Equations on Black Hole Geometrics II,* J.Math. Phys. 26, 2286-2296 (1985).

22. Torrence, R.J. and Couch, W.E., *Note on Equivalence of Cosmological Space-Times,* Gen. Rel. Grav. 18, 585-589 (1986).

23. Couch, W.E. and Torrence, R.J., *Spherically Symmetric Space-Times Transparent to Scalar Multipole Waves,* Gen. Rel. Grav. 18, 767-780 (1986)

24. Couch, W.E. and Torrence, R.J., *A Class of Wave Equations with Progressive Wave Solutions of Finite Order,* Phys. Lett. 117A, 270-274 (1986).

25. Torrence, R.J. and Couch, W.E., *Progressing Waves and Spherical Space Times,* Gen. Rel. and Grav. 20, 343-358 (1988).

26. Torrence, R.J. and Couch, W.E., *Note on Kantowski-Sachs Space-times.* Gen. Rel. Grav. 20, 603-606 (1988).

27. Couch, W.E. and Torrence, R.J., *Generalized Darboux Maps and Massless Spin-s Fields,* Gen. Rel. Grav. 21, 509-515 (1989).

28. Couch, W.E., *Space-Times with Exactly Solvable Gravitational perturbations,* in proceedings of the 3rd Canadian Conference on General Relativity and Relativistic Astrophysics, Ed. A. Coley, F. Cooperstock, B. Tupper, World Scientific 1990, 102-105.

29. Torrence, R.J. and Couch, W.E., *Master Equation for Some Gauge Invariant Gravitational Perturbations,* Gen. Rel. Grav. 22, 1397-1396 (1990).

30. Couch, W.E. and Torrence, R.J., *Progressing Wave Gravitational Perturbations of Robertson-Walker Space-Times,* Gen. Rel. Grav. 22, 1397-1412 (1990).

31. Bombelli, L., Couch, W.E. and Torrence, R.J., *Wake-Free Waves in One and Three Dimensions,* J. Math. Phys. **32**, 106-108(1991).

32. Bombelli, L., Couch, W.E. and Torrence, R.J., *Time as Spacetime 4-Volume and the Ashtekar Variables,* Phys. Rev. D **44**, 2589-2592(1991).

33. Bombelli, L., Couch, W.E. and Torrence, R.J., *Solvable Systems of Wave Equations and non-abelian Toda Lattices,* J. Phys. A **25**, 1309-1327(1992).

34. Couch, W.E. and Torrence, R.J., *Variable Coefficient Wave Equations with Exact Spreading Solutions,* J. Phys. A. **26**, 5491-5504(1993).

35. Bombelli, L., Couch, W.E., and Torrence, R.J., *Perfect Fluid Perturbations of Cosmological Spacetimes in Stewart's Variables,* Class Quantum Grav. **11**, 139-155(1994).

36. Couch, W.E. and Torrence, R.J., *Wave Splitting and Lattice Dynamics,* J. Phys. A. **28**, 4609-4621(1995).

37. Couch, W.E. and Torrence, R.J., *Progressing Wave Perturbations of Cosmological Spacetimes,* Gen. Rel. Grav. **28**, 163-177(1996).

38. Couch, W.E. and Torrence, R.J., *Note on Gauging Cosmological Density Perturbations*, Can. J. Phys. **74,** 182-184(1996).

39. Couch, W.E., Surovy, M., and Torrence, R.J., *Some Singular Motions of Non-Abelian Toda Lattices,* Can. J. Phys., **78**, 99-112(2000).

40. Couch, Eugene, *An Overlooked Calculus Question*, The College Mathematics Journal **33**, 399-400(2002).

41. Couch, W.E. and Holder, C.L., *Liouvillian Perturbations of Black Holes*, J. Math. Phys. **48**, 102502(2007), 26 pages.

NON-REFEREED PUBLICATIONS:

1. Couch, W.E., *Plato Pilot Course in Mathematics and Statistics*, The Big Byte **21**, 4-7(1988).

UNPUBLISHED ESSAYS AND REPORTS:

1. Couch, W.E., *Conformally Flat Einstein-Maxwell Spacetimes,* University of Pittsburgh, 1964.

2. Couch, W.E., *Asymptotic Properties of Gravitational Radiation,* Ph.D. Thesis, University of Pittsburgh, 1966.

3. Couch, W.E. and Torrence, R.J., *The Self-Interaction of Gravitational Radiation*, 1969 Gravity Research Foundation Essay Award (Honourable Mention).

4. Couch, W.E., *Colliding Plane Gravitational Waves,* University of Pittsburgh, 1971.

5. Colvin, D.R. and Couch, W.E., *Seismic Waves and Permafrost Models,* University of Calgary, 1979.

6. Couch, W.E., *Report on the Possibilities for Computer Assisted Instruction in the Department of Mathematics and Statistics*, University of Calgary, 1987.

7. Couch, W.E., *Applied Mathematics Explicit Syllabus*, University of Calgary, 2001.