Richard Taylor

Curriculum Vitae

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Education

1999–2004 **Ph.D., Applied Mathematics**, *University of Waterloo*, Waterloo, Canada.
"Probabilistic properties of delay differential equations." Supervisor: Sue Ann Campbell

1998–1999 **M.Sc., Geophysics**, *University of British Columbia*, Vancouver, Canada.
"Modeling elastic wave velocities in porous media." Supervisor: Rosemary Knight

1993–1998 **B.Sc. (Hons), Physics**, *University of British Columbia*, Vancouver, Canada.
Undergraduate thesis: "Modeling evaporative drying in porous rock."

Employment

2005 – **Senior Lecturer**, *Thompson Rivers University, Dept. of Mathematics & Statistics*, Kamloops BC, Canada, full time continuing position with tenure.
- Approved as Associate Graduate Instructor 2015
- Promoted to Senior Lecturer 2015
- Cross-appointed to Department of Physics 2014
- Granted tenure 2013
- Hired as Assistant Professor 2005

2005 **Instructor**, *Capilano College, Dept. of Mathematics*, North Vancouver BC, Canada, full time sessional contract (summer semester, 2 courses).

2003–05 **Assistant Professor**, *Okanagan University College, Dept. of Mathematics and Dept. of Physics*, Salmon Arm BC, Canada, full time limited-term contract.

2003 **Instructor**, *British Columbia Institute of Technology, Dept. of Mathematics*, Burnaby BC, full time sessional contract (one course).

2002 **Instructor**, *University of British Columbia, Dept. of Mathematics*, Vancouver BC, part time sessional contract (one course).

2001 **Instructor**, *University of Waterloo, Faculty of Mathematics*, Waterloo ON, part time sessional contract (one course).

1999–2001 **Graduate Teaching Assistant**, *University of Waterloo, Faculty of Mathematics*, Waterloo ON, part time.

1996–1998 **Research Assistant**, *University of British Columbia, Dept. of Geophysics*, Vancouver BC, part time.

Publications

*(Student names in **boldface**)*

Peer Reviewed

2019 Richard Taylor, **Kurtis Manke** and D.B. (Don) Keele, Jr. Circular-arc line arrays with amplitude shading for constant directivity. J. Audio Eng. Soc. 67(6), 400-413, 2019.

2018 **Stephanie A. Winton**, Richard Taylor, Christine A. Bishop and Karl W. Larsen. Estimating actual versus detected road mortality rates for a northern viper. *Global Ecology and Conservation* 16, eprint e00476, 2018.

2017 Richard Taylor and D.B. (Don) Keele, Jr. Theory of constant directivity circular-arc line arrays. *143rd Convention of the Audio Engineering Society*, New York NY, Oct. 2017.

2017 Richard Taylor, **Kurtis Manke** and D.B. (Don) Keele, Jr. Constant directivity circular-arc arrays of dipole elements. *143rd Convention of the Audio Engineering Socieity*, New York NY, Oct. 2017.

2013 **B.M.C. Friedman**, M.G. Abraham, M. Paetkau, S.R. Taylor, and C. Ross Friedman. Use of a varying turn-density coil (VTDC) to generate a constant-gradient magnetic field and to demonstrate the magnetic force on a permanent magnet. *Canadian Journal of Physics*, 91(3), 226–230, 2013.

2007 S. Richard Taylor and Sue Ann Campbell, Approximating chaotic saddles for delay differential equations. *Phys. Rev. E* 75(4), eprint 046215, 2007.

2003 S. Richard Taylor and Rosemary J. Knight, Incorporating mechanisms of fluid pressure relaxation into inclusion-based models of elastic wave velocities. *Geophysics* 68(4), 1173–81, 2003.

2003 S. Richard Taylor and Rosemary J. Knight, An inclusion-based model of elastic wave velocities incorporating patch scale fluid pressure relaxation. *Geophysics* 68(5), 1503–9, 2003.

Non-Peer Reviewed Conference Papers and Technical Articles

2018 **Kurtis Manke**, Richard Taylor, Mark Paetkau and D.B. (Don) Keele, Jr. Implementation of a Dipole Constant-Directivity Circular-Arc Array. e-Brief 381. *143rd Convention of the Audio Engineering Society*, New York NY, Oct. 2017.

2013– "Richard's Stuff", http://rtaylor.sites.tru.ca. An audio engineering blog consisting of original technical articles, otherwise unpublished, of interest to audio engineers and DIY audio enthusiasts.

2011 S. Richard Taylor and **Stacey Lamont**. Computer Optimization of Job Rotation Schedules in Laboratory Accession at Royal Inland Hospital. Technical Report.

Service and Leadership Roles

Departmental Service

2019– **Appointments Committee**, *member*, Dept. of Math. & Stats.

2019– **Curriculum Committee**, *member*, Dept. of Math. & Stats.

2012–19 **Curriculum Committee**, *Chair*, Dept. of Math. & Stats.

2014–19 **Program Coordinator**, Dept. of Math. & Stats.

2015–19 **Graduate Program Advisory Committee, M.Sc. in Data Science**, *member*.

2014– **Undergraduate Student Advisor**, Dept. of Math. & Stats.

2014– **Recruitment & Retention Committee**, *member*, Dept. of Math. & Stats.

2005–15 **Math Help Centre**, *tutor*, Dept. of Math. & Stats.

Faculty Service

2018 **Science Tenure & Promotion Committee**, *member*, for a faculty member's promotion to Senior Lecturer.

2016 **Science Tenure & Promotion Committee**, *member*, for a faculty member's promotion to Senior Lecturer.

2014–16 **Engineering Program Advisory Committee**, *Math. & Stats. rep*.

2011–16 **Science Recruitment and Retention Committee**, *Math. & Stats. rep*.

University Service

2019– **Engagement Steering Committee**, *Faculty rep*.

2012–2019 **Subject Matter Expert**, *Mathematics*, assessing transfer credit requests on behalf fo the Transfer Credit Office.

2012–16 **Articulation Working Group**, *Math. & Stats. rep*.

2012–16 **Research Computing and Technology Advisory Committee**, *Science rep*.

Community Service

2015–19 **BC High Schools Math Contest Organizing Committee**, *member*, Editing and typesetting all contest problems and solutions for this province-wide event.

2005–19 **BC High Schools Math Contest**, *volunteer*, helping to organize and host the final round of the contest held annually at TRU.

2014– **Statistical Analysis of Readiness Tests**, *developer*, Developed and maintained an online interactive tool for analyzing performance of "readiness tests" for first-year math courses, at http://legendre.tru.ca/readiness_tests.

2005– **Math Outreach & Schools Liaison**, *volunteer*, math enrichment activities presented at visits to local schools (Parkcrest Elementary, Aberdeen Elementary, South Sahali Elementary, Sahali Secondary, NorKam Secondary) and annual sessions at the Cariboo Mainline Regional Science Fair and the School District 73 Math Challenge.

Student Research Supervision

Graduate Students

2019– **M.Sc. thesis supervisory committee**, *Thompson Rivers University, Canada.*
Jade Spruyt. Thesis title TBA. M.Sc. in Environmental Science.

2015–18 **M.Sc. thesis supervisory committee**, *Thompson Rivers University, Canada.*
Stephanie Winton,"Assessing the relationship between roads and Northern Pacific Rattlesnakes (*Crotalus oreganus*) in South Okanagan, BC." M.Sc. in Environmental Science.

2015 **Ph.D. thesis external referee**, *Alexandria University, Egypt.*
Eman Rashad Elwan Mohamed,"Numerical optimization methods for output feedback pole assignment."

Undergraduate Students

2019 **Project supervisor**, *Thompson Rivers University, Canada.*
Vincent Daley,"Experimental implementation and measurement of an allpass linear array". Research project funded by an award (to the student) from the TRU Undergraduate Research Experience Award program.

2019 **Project supervisor**, *Thompson Rivers University, Canada.*
Vincent Daley, "Computing mode amplitudes for a circular antenna array on a cylinder". Research project funded by an award (to myself) from the TRU Undergraduate Research Apprenticeship program.

2017 **Project supervisor**, *Thompson Rivers University, Canada.*
Kurtis Manke,"Dipole antenna arrays with constant directivity". Research project funded by an award (to the student) from the TRU Undergraduate Research Experience Award program.

2015 **B.Sc. thesis examining committee**, *Thompson Rivers University, Canada.*
Benjamin Moore, "Mixing and recolouring problems."

2013 **B.Sc. thesis supervisor**, *Thompson Rivers University, Canada.*
Natascha Hedrich, "Phase correction with allpass filters and the Remez algorithm."

2013 **B.Sc. thesis examining committee**, *Thompson Rivers University, Canada.*
Aaron Martens, "The Prime Number Theorem."

2013 **Project supervisor**, *Thompson Rivers University, Canada.*
Shane Sangha, "Inverse kinematics for development of a welding and plasma cutting industrial robot." Applied research for axiMech, a Kamloops manufacturing company.

2012 **Project supervisor**, *Thompson Rivers University, Canada.*
Aaron Plahn, "Regularization and chaos in the classical three-body problem." Research term funded by an award (to the student) from the TRU CUEF Undergraduate Student Research Experience Award program.

2010 **B.Sc. thesis supervisor**, *Thompson Rivers University, Canada.*
Susan Kinniburgh, "Ergodic theory."

2010 **B.Sc. thesis examining committee**, *Thompson Rivers University, Canada..*
Laura Teshima, "Swarm optimization."

2008   **Project supervisor**, *Thompson Rivers University, Canada.*.
Stacey Lamont. Applied research funded by a contract with the Interior Health Authority. Computer-aided automation and optimization of job rotation scheduling for the laboratory at Royal Inland Hospital, and of tournament scheduling for the City of Revelstoke Parks & Recreation Dept.

2007   **B.Sc. thesis examining committee**, *Thompson Rivers University, Canada.*
Timothy Graves, "Quantum computing."

2007   **B.Sc. thesis examining committee**, *Thompson Rivers University, Canada.*
Sam Bassett, "Graph recolouring."

2007   **Project supervisor**, *Thompson Rivers University, Canada.*
Timothy Graves, "Dynamics and regularization of the classical three-body problem." Research term funded by an award (to the student) from the TRU CUEF Undergraduate Student Research Experience Award program.

Research Interests

- Physical acoustics and digital signal processing; circular and other conformal acoustical arrays; applications to sound reproduction.
- Dynamical systems, chaos, and ergodic theory; delay differential equations.
- Numerical analysis, scientific computing, modeling and simulation.
- Scheduling automation and optimization.

Academic Awards

2019	**TRU Undergraduate Research Apprenticeship Award**, TRU, $4,000.
2001–2003	**NSERC Post-Graduate Scholarship B**, U. Waterloo, $38,200.
1999–2001	**NSERC Post-Graduate Scholarship A**, U. Waterloo, $34,600.
1999–2003	**Mathematics Faculty Graduate Scholarships**, U. Waterloo, $12,000.
2000–2001	**University of Waterloo Graduate Scholarship**, U. Waterloo, $1,000.
1998–1999	**University of British Columbia Graduate Fellowship**, UBC, $15,000.
1997–1998	**Walter D. Frith Scholarship**, UBC, $900.
1993–1995	**President's Entrance Scholarship**, UBC, $4,800.
1993–1995	**Canada Science Scholarship**, UBC, $5,000.

Technical/Computer Skills

- R
- Matlab/Octave
- Python
- Perl
- Asymptote
- Bash/shell scripting
- Linux/Unix
- C/C++
- Fortran
- HTML
- XML/XSLT
- OpenSCAD (3D CAD)
- gmsh (meshing)
- AcouSTO (acoustics)
- Tablix (schedule optim.)
- LaTeX

Presentations

Conference Presentations

2019 "Linear Arrays for Acoustic Diffusion." Invited talk at annual meeting of the Canadian Applied and Industrial Mathematics Society, Whistler BC.

2017 "Theory of Constant Directivity Circular-Arc Line Arrays." Talk at *143rd Convention of the Audio Engineering Society*, New York NY.

2017 "Constant Directivity Circular-Arc Arrays of Dipole Elements." Poster presentation at *143rd Convention of the Audio Engineering Society*, New York NY.

2016 "Assessing Our Calculus Readiness Test". Invited talk at Sharing Math conference, Columbia College, Vancouver BC.

2007 "Approximating Chaotic Saddles for Delay Differential Equations". Talk at annual meeting of the Canadian Applied and Industrial Mathematics Society, Banff AB.

1996 "Numerical modeling of evaporation in porous rock samples." Poster presentation at Fall Meeting of the American Geophysical Union, San Francisco CA. Abstract in *EOS Trans. AGU*, 77(46), Fall Meet. Suppl., F746.

Other

2017 "Doodles and Fractal Geometry". Invited lecture, Day of Arts & Science, Thompson Rivers University.

2014 "Doodles and Fractal Geometry". Keynote Lecture, BC High Schools Math Contest, Thompson Rivers University.

2011 "Density Evolution for Delay Differential Equations". Invited talk, Mathematical Biology research group, UBC Okanagan.

2011 "Density Evolution for Delay Differential Equations". Mathematics & Statistics departmental seminar, Thompson Rivers University.

2010 "Mathematics and Music: Timbre and Consonance". Mathematics & Statistics departmental seminar, Thompson Rivers University.

2008 "Approximating Chaotic Saddles for Delay Differential Equations". Mathematics & Statistics departmental seminar, Thompson Rivers University.

2007 "The Calculus of variations: All you need to know in one easy lesson". Mathematics & Statistics departmental seminar, Thompson Rivers University.

2006 "The Interplanetary superhighway: Chaotic transport through the solar system". Mathematics & Statistics departmental seminar, Thompson Rivers University.

2006 "The Interplanetary superhighway: Chaotic transport through the solar system". Keynote Lecture, BC High Schools Math Contest, Northwest Community College, Prince Rupert.

▬▬▬ Consulting and Other Projects

2013–19 **rt-plugins,** http://faculty.tru.ca/rtaylor/rt-plugins.
Developed and maintained an open-source suite of PC-based digital filters for audio enthusiasts.

2013 **Royal Inland Hospital**, *Renal Unit*.
Designed and manufactured of acoustical remediation for patient interview rooms.

2008 **Royal Inland Hospital**, *Laboratory Accession*, Brian Redford, HR Director.
Designed and implemented computer software that uses genetic and simulated annealing algorithms to resolve conflicts and optimize resource allocation in the job rotation schedule in the RIH laboratory.

2008 **City of Revelstoke**, *Parks & Recreation*, Alan Chell, Director.
Designed and implemented computer software that uses to resolve conflicts and optimize resource allocation in the game schedules for both the annual Big Bear soccer tournament and the Glacier Challenge slowpitch tournament.

2005 **Okanagan University College**, *Salmon Arm Campus*, Lynda Wilson, Principal.
Designed and implemented computer software to resolve conflicts and optimize resource allocation in the course schedule for the 2005-06 academic year.

2004 **Golder Associates Engineering**, *Kamloops office*, Matthew Thibeault PEng, Associate.
Developed formulas for analysis of soil cut geometry in a railway design.

2004 **UBC Dept. of Mathematics**, Brian Seymour PhD, Professor.
Programmed a suite of Matlab scripts for computing solutions of boundary-value, eigenvalue and integral problems for acoustical modeling.

2003 **BC Ministry of Energy, Mines & Petroleum Resources**, JoAnne Nelson MSc, PGeo, Senior Mineral Geologist.
Developed an Excel spreadsheet template for statistical analysis of rock dating.

▬▬▬ Performing Arts

(Only invited/paid gigs are listed.)

Jan 2020 **City of Kamloops**, *Mayor's Gala for the Arts*.
Played accordion with guitar accompaniment: a set of chansons musette (French café songs) as musical entertainment during dinner for this fund-raising event. (With Toby Wendland.)

Feb 2019 **Office of Surrealist Investigations**, Craig Willms, artistic director.
Provided musical entertainment (accordion with guitar accompaniment) for a private gallery event. (With Toby Wendland.)

Jan 2019 **Kamloops Art Gallery**, *Adad Hannah – Glints & Reflections*.
Provided musical entertainment (accordion with guitar accompaniment) for this gallery exhibit opening. (With Toby Wendland.)

Oct 2015 **Kamloops Museum**, *Western Canada Theatre at 40*.
Played piano accompaniment for a singer, as musical entertainment for this exhibit opening. (With Sheanna James.)

April 2015   **BC Psychogeriatric Association**, *Annual Conference*.

Played accordion with guitar accompaniment: a set of chansons musette (French café songs) as musical entertainment during the conference reception. (With Toby Wendland.)

Nov 2013/14   **Western Canada Theatre**, *High-Wire Festival*, Daryl Cloran, artistic director.

Played piano in a jazz ensemble: a set of jazz standards as the intro/outro of a theatre production. 3 shows each year. (With the Sheanna James quintet.)

Oct 2012   **BC Living Arts**, *Webley Awaits*, Alan Corbishley, writer/director.

Played accordion and harmonica in the stage band of a musical theatre production showcasing the music of Tom Waits and Jason Webley. 4 shows.

Dec 2011   **Kamloops Symphony Orchestra**, *Annual Fundraiser Banquet*.

Played accordion with guitar accompaniment as musical entertainment during dinner. (With Toby Wendland.)

April 2010   **BC Living Arts**, *Opera'licious*.

Played accordion with guitar accompaniment as musical entertainment during dinner. (With Toby Wendland.)

Recreational Interests

- o Musician: classical & jazz piano, accordion, guitar, harmonica.
- o Athlete: nordic and downhill skiing, cycling, kayaking, swimming.
- o Other: woodworking, sound reproduction.