

# Curriculum Vitae

Erik Talvila

Mathematics and Statistics

University of the Fraser Valley

Chilliwack, British Columbia

V2P 6T4 Canada

Erik.Talvila@ufv.ca

604-792-0025 local 2524 (office)

604-792-2388 (fax)

Place of birth: Toronto, Canada.

My Erdős number is 3.

## Education

- Ph.D. University of Waterloo, Applied Mathematics. January, 1997. Supervisor: D. Siegel. Thesis title: *Growth estimates and Phragmén-Lindelöf principles for half space problems.*
- M.Sc. University of Western Ontario, Applied Mathematics. September, 1991. Supervisor: D. Naylor. Thesis title: *A finite Bessel transform.*
- B.Sc. University of Toronto, Mathematics and Physics. May, 1988.

## Employment history

- August 2005 to present, University College Professor; August 2003 to August 2005, Probationary Faculty, Mathematics and Statistics, University of the Fraser Valley.
- July 2000 to July 2003, Visiting Assistant Professor, Mathematical and Statistical Sciences, University of Alberta.
- August 1998 to July 2000, NSERC Postdoctoral Fellow, Mathematics, University of Illinois at Urbana–Champaign.
- September 1997 to July 1998, Lecturer, Applied Mathematics, University of Western Ontario.
- January 1997 to September 1997, Assistant Professor, Applied Mathematics, University of Waterloo.
- January 1993 to December 1997, Part time lecturer: University of Waterloo, Wilfred Laurier University, Wichita State University.

## Publications in refereed journals

18. Erik Talvila, *Fourier series with the continuous primitive integral*, Journal of Fourier analysis and applications. (Accepted May 13, 2011.)
17. Erik Talvila, *The regulated primitive integral*, Illinois Journal of Mathematics, **53**(2009), 1187–1219.

16. Erik Talvila, *Convolutions with the continuous primitive integral*, Abstract and Applied Analysis (2009), Art. ID 307404, 18 pp.
15. Erik Talvila, *The distributional Denjoy integral*, Real Analysis Exchange **33**(2008), 51–82.
14. Erik Talvila, *Continuity in the Alexiewicz norm*, Mathematica Bohemica **131**(2006), 189–196.
13. Erik Talvila, *Estimates for Henstock–Kurzweil Poisson integrals*, Canadian Mathematical Bulletin **48**(2005), 133–146.
12. Erik Talvila, *Estimates of the remainder in Taylor’s theorem using the Henstock–Kurzweil integral*, Czechoslovak Mathematical Journal **55(130)**(2005), 933–940.
11. Peter A. Loeb and Erik Talvila, *Lusin’s Theorem and Bochner integration*, Scientiae Mathematicae Japonicae **60**(2004), 113–120.
10. Parasar Mohanty and Erik Talvila, *A product convergence theorem for the Henstock–Kurzweil integral*, Real Analysis Exchange **29**(2003/2004), 199–204.
9. Erik Talvila, *Henstock–Kurzweil Fourier transforms*, Illinois Journal of Mathematics **46**(2002), 1207–1226.
8. David Siegel and Erik Talvila, *Sharp growth estimates for modified Poisson integrals in a half space*, Potential analysis **15**(2001), 333–360.
7. Erik Talvila, *Rapidly growing Fourier integrals*, American Mathematical Monthly **108**(2001), 636–641.
6. Erik Talvila, *Necessary and sufficient conditions for differentiating under the integral sign*, American Mathematical Monthly **108**(2001), 544–548.
5. Erik Talvila, *Some divergent trigonometric integrals*, American Mathematical Monthly **108**(2001), 432–436.
4. Peter A. Loeb and Erik Talvila, *Covering theorems and Lebesgue integration*, Scientiae Mathematicae Japonicae **53**(2001), 209–221.
3. Erik Talvila, *Limits and Henstock integrals of products*, Real Analysis Exchange **25**(1999/2000), 907–918.
2. David Siegel and Erik Talvila, *Pointwise growth estimates of the Riesz potential*, Dynamics of Continuous, Discrete and Impulsive Systems **5**(1999), 185–194.
1. David Siegel and Erik Talvila, *Uniqueness for the  $n$ -dimensional half space Dirichlet problem*, Pacific Journal of Mathematics **175**(1996), 571–587.

**Preprints**

1. Erik Talvila and Matthew Wiersma, *Optimal error estimates for corrected trapezoidal rules*.
2. Erik Talvila and Matthew Wiersma, *Simple derivation of basic quadrature formulas*.
3. Erik Talvila, *The  $L^p$  primitive integral*.
4. Erik Talvila, *Integrals and Banach spaces for finite order distributions*.

**Other publications**

12. Erik Talvila, *Review of A Garden of Integrals*, American Mathematical Monthly **116**(2009), 90–94.
11. Erik Talvila, *Characterizing integrals of Riemann integrable functions*, Real Analysis Exchange **33**(2008), 487.
10. Erik Talvila, *Ralph Henstock: research summary*, Scientiae Mathematicae Japonicae **67**(2008), 11–12.
9. Erik Talvila, *The regulated primitive integral on the real line*, Real Analysis Exchange 2006, 30th Summer Symposium Conference, 35–38.
8. Erik Talvila, *Distributional integrals on the real line*, Real Analysis Exchange 2005, 29th Summer Symposium Conference, 7–8.
7. Erik Talvila, *Covering theorems and integration*, Real Analysis Exchange 2004, 28th Summer Symposium Conference, 41–47.
6. Erik Talvila, *Estimates of Henstock/Kurzweil Poisson integrals*, Real Analysis Exchange 2002, 26th Summer Symposium Conference, 47–51.
5. Erik Talvila, *Half plane Dirichlet and Neumann problems*, Real Analysis Exchange 2001, 25th Summer Symposium Conference.
4. Patrick Muldowney and Erik Talvila (eds.), AMS Special Session on Nonabsolute Integration, University of Toronto (2000)  
<http://www.emis.de/proceedings/index.html>
3. Erik Talvila, *Nonabsolutely convergent Poisson integrals*, AMS Special Session on Nonabsolute Integration, University of Toronto (2000)  
<http://www.emis.de/proceedings/index.html>
2. Erik Talvila, *Some divergent integrals and the Riemann–Lebesgue lemma*, Real Analysis Exchange 2000, 24th Summer Symposium Conference, 161.
1. Erik Talvila, *Limit theorems for products of Henstock integrable functions*, Real Analysis Exchange 1999, 23th Summer Symposium Conference. Real Analysis Exchange **25**(1999/2000), 17–18.

**Research interests**

- non-absolute integration (Henstock–Kurzweil integrals and distributional integrals) with applications to differential equations and integral transforms
- Fourier analysis
- numerical analysis
- methods of summation for series

**Talks**

I have given over 40 talks at international conferences, colloquia and seminars and have addressed faculty, graduate, undergraduate and high school students. Here are most of the talks I have given over the past years.

- “Fourier series with the continuous primitive integral” November 19, 2010, 24th Auburn mini-conference in harmonic analysis, Auburn, Alabama.
- “Distributional integrals” October 16, 2010, Colloquium on differential equations and integration theory, Křtiny, Czech Republic.
- “Convolutions with the continuous primitive integral” July 14, 2010, XXXIV Summer Symposium in Real Analysis, College of Wooster, Wooster, Ohio.
- “The continuous primitive integral” April 4, 2009, Mathematical Association of America, Central Washington University, Ellensburg.
- “Math on YouTube” November 10, 2008, Math Club, University of the Fraser Valley.
- “Banach lattice for distributional integrals” June 8, 2008, XXXII Summer Symposium in Real Analysis, Chicago State University.
- “Integration” March 18, 2008, NSERC lecture series, University of the Fraser Valley.
- “Distributional integrals” January 7, 2008, Mathematical Association of America, San Diego.
- “The regulated integral on the real line” June 2006, XXX Summer Symposium in Real Analysis, University of North Carolina, Asheville.
- “Distributional integrals on the real line” June 22, 2005, XXIX Summer Symposium in Real Analysis, Whitman College, Walla Walla, Washington.
- “The Morse covering theorem and integration” July 16, 2004, 11th Meeting on Real Analysis and Measure Theory, Hotel Terme, Ischia, Italy.
- “Covering Theorems and Integration” June 2004, XXVIII Summer Symposium in Real Analysis, Slippery Rock University, Slippery Rock, Pennsylvania.

- “Distributional integrals: descriptive and Riemann sum definitions” April 3, 2004, American Mathematical Society, University of Southern California, Los Angeles.
- “The distributional Denjoy integral” June 15, 2003, Canadian Mathematical Society, University of Alberta.
- “Henstock–Kurzweil Fourier transforms” March 11, 2003, University of Missouri, Kansas City.
- “Conditionally convergent Fourier transforms” November 6, 2002, Approximation theory seminar, University of Alberta.
- “Nonabsolutely convergent Fourier transforms” August 20, 2002, University of Waterloo.
- “Asymptotics of Fourier transforms” June 6, 2002, University College of the Fraser Valley.
- “The Dirichlet problem with Henstock/Kurzweil boundary data” June 26, 2002, XXVI Summer Symposium on Real Analysis, Washington and Lee University, Lexington, Virginia.
- “Application of the Henstock–Kurzweil integral to the half plane Dirichlet problem” May 4, 2002, American Mathematical Society, Université de Montréal.
- “Henstock/Kurzweil Fourier transforms” March 22, 2002, Spring Mini-Conference on Real Analysis, San Bernardino State University, San Bernardino, California.
- “Pointwise Fourier inversion without the Riemann-Lebesgue Lemma” October 5, 2001, American Mathematical Society, Chattanooga, Tennessee.
- “Half plane Dirichlet and Neumann problems” May 26, 2001, XXV Summer Symposium in Real Analysis, Weber State University, Ogden, Utah.
- “A survey of nonabsolute integration” May 3, 2001, Colloquium, University of Illinois at Urbana–Champaign.
- “Nonabsolutely convergent Poisson integrals” September 24, 2000, American Mathematical Society, University of Toronto.
- “Covering theorems and Lebesgue integration” September 1, 2000, Summer School on Geometric and Dynamical Aspects of Measure Theory, Révfülöp, Hungary.
- “Some divergent integrals and the Riemann–Lebesgue lemma” May 25, 2000, XXIV Summer Symposium in Real Analysis, University of North Texas, Denton.
- “Two applications of finite sums of spherical harmonics” January 10, 2000, San Diego Symposium on Asymptotics and Applied Analysis, San Diego State University.

- “Some divergent integrals and the Riemann–Lebesgue lemma” December 9, 1999, Analysis Seminar, University of Illinois at Urbana–Champaign.
- “Limit theorems for products of Henstock integrable functions” June 21, 1999, XXIII Summer Symposium in Real Analysis, Łódź University, Poland.
- “Pointwise Growth Estimates for Riesz Potentials” January 8, 1999, Conference on Singular and Oscillatory Integrals, University of Wisconsin, Madison.
- “Pointwise Growth Estimates for Riesz Potentials” November 12, 1998, Graduate Student Seminar, University of Illinois at Urbana–Champaign.
- “Introduction to non-absolute integration” October 22, 1998, Analysis Seminar, University of Illinois at Urbana–Champaign.
- “Growth estimates for Newtonian potentials” July 14, 1998, Society for Industrial and Applied Mathematics Annual General Meeting, University of Toronto.
- “Infinitely large numbers” March 24, 1998, High School Contest Problems Group, University of Western Ontario.
- “Phragmén-Lindelöf principles and elliptic differential equations” November 25, 1997, Department of Mathematics Seminar, University of Western Ontario.
- “Finite sums of spherical harmonics and the unique continuation problem for the Schrödinger equation” November 11, 1997, Applied Mathematics Colloquium, University of Western Ontario.
- “Growth estimates for modified Poisson integrals” September 28, 1997, American Mathematical Society, Université de Montréal.
- “Growth estimates for the Riesz potential” (abstract only) August 4, 1997, International Conference on Differential Equations and Dynamical Systems, University of Waterloo.
- “Integrals that depend on a parameter” July 9, 1997, Applied Mathematics/Pure Mathematics Club, University of Waterloo.
- “The Poisson integral for the half space Laplace equation” October 22, 1996, Mathematics Colloquium, Wilfred Laurier University, Waterloo, Ontario.
- “Modified Poisson integrals in a half space” June 11, 1996, Applied Mathematics Colloquium, University of Western Ontario.
- “A new Phragmén-Lindelöf principle for the half space Dirichlet problem” January 19, 1995, Differential Equations Seminar, University of Waterloo.

- “A Phragmén-Lindelöf principle for elliptic partial differential equations” March 7, 1994, “A new Phragmén-Lindelöf principle” April 4, 1994, Mathematics Colloquium, Wichita State University.
- “Uniqueness for the half space Dirichlet problem” October 15, 1993, Mathematics Seminar, University of Alberta.
- “Uniqueness for the  $n$ -dimensional half space Dirichlet problem” June 6, 1993, International Symposium on Comparison Methods and Stability Theory, Fields Institute, Waterloo.

### Conference organisation

- Mathematical Association of America Joint Meeting, *Topics and Techniques for Teaching Real Analysis*. January 2012, Boston (with Paul Musial, Jimmy Peterson and Robert Vallin).
- Mathematical Association of America Joint Meeting, *Topics and Techniques for Real Analysis*. January 2008, San Diego (with Jimmy Peterson and Robert Vallin).
- Canadian Mathematical Society, *Symposium on Real Analysis*. June 2003, University of Alberta, Edmonton.
- American Mathematical Society, *Special Session on Nonabsolute Integration*. September 2000, Toronto (with Patrick Muldowney). The proceedings, edited P. Muldowney and E. Talvila, have been published by the The Electronic Library of Mathematics. <http://www.emis.de/proceedings/index.html>

### Teaching Experience

Since 1994 I have taught at seven universities. This includes pre-calculus, linear algebra, first and second year calculus, discrete mathematics, business mathematics, ordinary and partial differential equations, real and complex analysis, metric spaces, and quantum mechanics. These courses have ranged from elementary level for general students to advanced level for mathematics majors. Class sizes run from 2 to 150. I have taught one correspondence course and have taught students of mathematics, business, education, science and engineering. I have taught graduate courses at the Universities of Alberta and Illinois.

### Undergraduate

- University of the Fraser Valley, Summer 2011. M112 Calculus.
- University of the Fraser Valley, Winter 2010. M095 Pre-calculus.
- University of the Fraser Valley, Winter 2010. M265 Transition to advanced mathematics.
- University of the Fraser Valley, Winter 2010. M444 Metric spaces.

- University of the Fraser Valley, Fall 2009. BUS 162 Mathematical methods for business.
- University of the Fraser Valley, Fall 2009. M340 Introduction to analysis.
- University College of the Fraser Valley, Winter 2009. M095 Pre-calculus.
- University College of the Fraser Valley, Winter 2009. M265 Transition to advanced mathematics.
- University College of the Fraser Valley, Fall 2008. M094 Pre-calculus.
- University College of the Fraser Valley, Fall 2008. M265 Transition to advanced mathematics.
- University College of the Fraser Valley, Fall 2008. M440 Fourier analysis.
- University College of the Fraser Valley, Winter 2008. M095 Pre-calculus.
- University College of the Fraser Valley, Winter 2008. M112 Calculus.
- University College of the Fraser Valley, Fall 2007. M111 Calculus.
- University College of the Fraser Valley, Fall 2007. M255 Differential equations.
- University College of the Fraser Valley, Fall 2007. M340 Introduction to analysis.
- University College of the Fraser Valley, Winter 2007. M095 Pre-calculus.
- University College of the Fraser Valley, Winter 2007. M112 Calculus.
- University College of the Fraser Valley, Fall 2006. M094 Pre-calculus.
- University College of the Fraser Valley, Fall 2006. M255 Differential equations.
- University College of the Fraser Valley, Fall 2006. M444 Metric spaces.
- University College of the Fraser Valley, Winter 2006. M095 Pre-calculus.
- University College of the Fraser Valley, Winter 2006. M112 Calculus.
- University College of the Fraser Valley, Winter 2006. M440 Fourier analysis.
- University College of the Fraser Valley, Fall 2005. M094 Pre-calculus.
- University College of the Fraser Valley, Fall 2005. M111 Calculus.
- University College of the Fraser Valley, Fall 2005. M255 Differential equations.
- University College of the Fraser Valley, Winter 2005. M095 Pre-calculus.
- University College of the Fraser Valley, Winter 2005. M214 Introduction to analysis.

- University College of the Fraser Valley, Fall 2004. M094 Pre-calculus.
- University College of the Fraser Valley, Fall 2004. M110 Pre-calculus.
- University College of the Fraser Valley, Fall 2004. M255 Differential equations.
- University College of the Fraser Valley, Winter 2004. M255 Differential equations. 15 students.
- University College of the Fraser Valley, Winter 2004. M320 Analysis. 8 students.
- University College of the Fraser Valley, Fall 2003. M094 Pre-calculus. 12 students.
- University College of the Fraser Valley, Fall 2003. M111 Calculus I. 35 students.
- University College of the Fraser Valley, Fall 2003. M112 Calculus II. 35 students.
- University of Alberta, Fall 2002. M209 Calculus III. 90 students.
- University of Alberta, Fall 2002. M222 Introduction to discrete mathematics. 90 students.
- University of Alberta, Winter 2002. M114 Intermediate Calculus I. 75 students.
- University of Alberta, Fall 2001, 2000. M300 Advanced boundary value problems I. 90 students.
- University of Alberta, Winter 2003, 2002, 2001. M309 Mathematical methods for electrical engineers. 90 students.
- University of Alberta, Fall 2000. M114 Elementary Calculus I. 90 students.
- University of Illinois at Urbana–Champaign, Fall 1998. M285 Differential equations and orthogonal functions. This was taught using Mathematica as part of the UIUC Calculus and Mathematica program. There were 30 students in my section.
- University of Western Ontario, Winter 1998. AM356 Advanced quantum mechanics. 3 students.
- University of Western Ontario, Fall 1997 and Winter 1998. AM20 Calculus. I had two sections of this multi-section, general level course. Class sizes were 25 and 85.
- University of Western Ontario, Fall 1997. AM376 Complex analysis and partial differential equations for electrical engineers. 50 students.
- University of Waterloo, Spring 1997. M136 Linear algebra for mathematics majors. Class size 150, a multi-section course.
- University of Waterloo, Winter 1997. M138 Calculus for mathematics majors. Class size 120, a multi-section course.

- Wilfred Laurier University, Fall 1996. M130 Calculus for business students. I taught two sections of this multi-section course. Each class had about 90 students.
- University of Waterloo, Spring 1996 and Fall 1996. AM351 Ordinary differential equations. This was a single section course, enrollment 25.
- University of Waterloo, Winter 1996. M220A Advanced calculus (correspondence). I corresponded with students by mail, telephone and email.
- University of Waterloo, Spring 1995. M237 Advanced calculus for mathematics majors. A single section course, enrollment 90.
- Wichita State University, Spring 1994. M111 College algebra, general level. This was a multi-section course, class size 25.

### **Graduate**

- University of Alberta, Winter 2002. M600 Introduction to Henstock integration.
- University of Illinois at Urbana-Champaign, Fall 1999. M468 Partial differential equations.

### **Teaching interests**

- using mathematics seminar courses and written assignments to improve student reading, writing and speaking ability
- broadening the lecture format to include computer aids to teaching, such as Maple, Mathematica and Matlab
- creating a stimulating and challenging mathematics course for students in other disciplines

### **Funding**

- 2001-2010 NSERC Discovery Grant \$7 000 p.a.
- 2003 University of Alberta Conference Grant (with Y. Lin and E. Woolgar) \$3000
- 2002 University Teaching Research Fund (with G. de Vries) \$9600
- 2000-2002 University of Alberta Science New Appointment Grant \$25 000

### **Student supervision**

- 2011, Kyler Johnson, “Maple for differential equations” Work/Study, University of the Fraser Valley.
- 2011, Kyler Johnson, “Summation methods” Research Assistant, University of the Fraser Valley.

- 2011, Matthew Wiersma, “Numerical integration algorithms”, NSERC Undergraduate Student Research Award, University of the Fraser Valley.
- 2010, Josh Wiebe, “Summing series via first order differential equations”, Work/Study, University of the Fraser Valley.
- 2009, Lewis Van Dyke, “Ordinary differential equations with Maple”, Work/Study, University of the Fraser Valley.
- 2009, Matthew Wiersma, “Generalisations of the trapezoidal and Simpsons rules”, NSERC Undergraduate Student Research Award, University of the Fraser Valley.
- 2009, Derek Lacoursiere, “Trapezoidal rule for  $L^p$  functions”, Work/Study, University of the Fraser Valley.
- 2007, Daniel Mori, “Numerical integration of monotonic functions”, NSERC Undergraduate Student Research Award, University of the Fraser Valley.
- 2007, Keith Heywood, “Algebras and complex numbers”, NSERC Undergraduate Student Research Award, University of the Fraser Valley.
- 2005, Luke Born, “Generalised trigonometric functions”, Work/Study, University of the Fraser Valley.
- 2004, Gareth Perry, “Fractals in Maple”, Work/Study, University of the Fraser Valley.
- 2004-2005, Max Neville, “Multiple point Taylor series”, NSERC Undergraduate Student Research Award, Work/Study, University of the Fraser Valley.
- 2004, Brianna Stusiak, Pauline van Ruitenbergh, “Methods for summing series”, Work/Study, University of the Fraser Valley.
- 2002-2003, Parasar Mohanty, “Operators commuting with translations”, Postdoctoral fellow, University of Alberta.
- 2001-2003, Chris Palmer, “A Henstock–Kurzweil approach to numerical integration”, M.Sc., University of Alberta.
- 2002, Aaron Levin, “Exact evaluation of Poisson integrals”, Research assistant, University of Alberta.
- 2002, David Steinberg, Knots in Maple, University Teaching Research Fund, University of Alberta.
- 2001, Stephanie Lee, “Summing series using differential equations”, NSERC Undergraduate Student Research Award, University of Alberta.

**Editorial**

- Associate editor for journal *Integration: mathematical theory and applications* (Nova Science)