# Curriculum Vitae


## Wai Lau
## Associate Professor
## Department of Mathematics
## Seattle Pacific University


## EDUCATION

| | | |
|---|---|---|
| Mathematics, Ph.D. | Texas A&M University | 1/93 - 5/98 |
| Mathematics, M.Sc. | Texas A&M University | 9/90 - 12/92 |
| Mathematical Science, B.Sc. | Hong Kong Baptist University | 10/85 - 6/89 |

## EMPLOYMENT

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|---|---|---|
| Seattle Pacific University | Assistant Professor | 2001-2007 |
| | Associate Professor | 2007- |
| University of Nevada, Reno | Visiting Lecturer | 2000-2001<br>1998-1999 |
| Colorado State University | Visiting Assistant Professor | 1999-2000 |
| Texas A&M University | Teaching and Research Assistant | 1990-1998 |
| Lai Chack High School (Hong Kong) | Teacher (CS/Math) | 1889-1990 |

**Ph. D. Dissertation** Reflexive Sheaves on Projective *n*-Space and the Dimension of Spaces of Multivariate Spline

## PUBLICATIONS

Peer-reviewed Journal Publication

1. Berg, Elisabeth, Wai Lau, and Elizabeth Nguyen, “Compartmental Pharmacokinetic Models”, *The Journal of Undergraduate Mathematics and Its Applications, 35.1 (2014), 61-88*.
2. W.W. Lau, "A Lower Bound for the Dimension of Trivariate Spline Spaces", *Constr. Approx. (2006) 23:23-31.*

Peer-reviewed Conference Papers

3. W.W. Lau, P.F. Stiller, and J.C. Trinkle, "On the Connectivity of Physical Contact Formation Cells", *Proc. IASTED International Conference on Applications of Control and Robotics 1996, Jan. 8-10, 1996, Florida, USA, 41-45.*
4. W.W. Lau, P.F. Stiller, and J.C. Trinkle, "Some Remarks on the Geometry of the Contact Formation Cells", *Proc. International Conference on Intelligent Robotics and Systems 1995, Aug. 5-9, Pittsburgh, Pennsylvania, USA, Vol. 3, 419-426.*

Work in Progress

5. W.W. Lau and P.F. Stiller, "Splines and Algebraic Geometry", *in preparation.*

## SCIENTIFIC TALKS

1. "An Equivalent Condition for the Exact Dimension of Bivariate Spline Spaces", 1033rd American Mathematics Society Meeting, Middle Tennessee State University, November 3-4, 2007.
2. "On the Dimensions of Bivariate Spline Spaces", Mathematical Association of America Pacific Northwest Annual Meeting, Linfield College, April 13-14, 2007.
3. "The Dimension Problem: From Bivariate to Trivariate Spline Spaces", Algebra Seminar, Department of Mathematics, Colorado State University, Oct. 12, 1999.
4. "The Dimension of the Spaces of Bivariate Splines", Colloquium, Department of Mathematics, University of Nevada, Reno, Nov. 5, 1998.
5. "Reflexive Sheaves on Projective *n*-Space and the Dimension of Spaces of Multivariate Splines", Center for Approximation Theory Annual Symposium 1997, Texas A&M University, April 26, 1997.
6. "On the Connectivity of Physical Contact Formation Cells", IASTED International Conference on Applications of Control and Robotics 1996, Jan. 8, 1996.
7. "The Kinematics of Multi-Fingered Manipulation I, II", Texas A&M University Robotic Research Group Seminar, Nov. 9 & 14, 1994.

## RESEARCH GROUPS

**Robotics Research Group** (Texas A&M University, 1994-96)

- Investigated the geometry of Contact Formation Cells.
- Developed algorithms for dexterous manipulation planning with and without uncertainty.
- Developed algorithms for path planning in unknown 3-dimensional environments.
- Gave a corrected proof to the Kinematics Formula for Multi-Fingered Contacts.

**Applied Meteorology Research Group - Wind Field Modeling and Forecasting Project** (Hong Kong Baptist University, Hong Kong Royal Observatory, 1987-89)

- The goal of this project was to build a wind forecasting model for Hong Kong.
- Wind Data (strength and direction) was collected every 5 minutes at 20 wind stations scattered around Hong Kong at different heights.
- Several kinds of *Spline* were implemented to interpolate a surface to fit the wind data. This allowed us to construct a wind field diagram on uniform rectangular grids to display the wind strength and direction at a particular height.
- Performed *Principal Components Analysis* to determine the major wind vector from the data base for different time periods. Seasonal and long term wind information were concluded based on this analysis.

- The major wind vectors served as the tokens for real time and short term wind forecasting.

## AWARD

Honorable Mention from the International Competition in Mathematical Modeling, 1986.

## COLLEGE-LEVEL TEACHING

***Seattle Pacific University***

*Regular Courses*

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|---|---|
| College Readiness Math II | Spring 15 |
| College Algebra | Winter 15 |
| Survey of Calculus | Spring 02-04, 05, 07-08, 00, 11, 14, 15 |
| Calculus I | Fall 01, 02, 04-15 |
| Calculus II | Winter 02, 03, 05-07, 09-15 |
| Calculus III | Fall 09, Spring09-12, 14-15 |
| Series and Differential Equations | Fall 02-07 Spring 02-03, 05-09 |
| Differential Equations | Fall |
| Introduction to Statistics | Fall 01, Winter 08 |
| Introduction to Contemporary Mathematics | Fall 03 |
| Mathematics for Computer Sciences | Winter 03, 04 |
| Linear Algebra | Winter 09, 15 |
| Discrete Mathematics | Fall 03, Spring 08, 12 |
| Applied Analysis I | Spring 05, Fall 06, 08, 12 |
| Complex Variables | Spring 06, 12 |
| Introduction to Analysis | Fall 10-13 |
| Analysis II | Winter 12, 14 |
| Axiomatic Geometry | Spring 09 |
| Numerical Analysis | Winter 04-14 Even number years |
| Mathematical Modeling | Winter 05-15 Odd number years |

*Independent Studies*

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| Discrete Mathematics | Winter 05, Summer 08 |
| Real Analysis II | Spring 05, 11 |
| Numerical Analysis | Spring 05 |
| Option Pricing Models I | Spring 06, Spring 08 |
| Actuarial Science I | Fall 06 |
| Differential Geometry | Spring 08 |
| Discrete Ecology Models | Summer 08 |
| Geometry in Nature | Fall 08 |

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| Computing with MATLAB | Spring 10-12 Fall 10 |
| Axiomatic Geometry | Summer 10 |
| Advanced Linear Algebra | Winter 11, Spring 12 |
| Senior Project Exploration/Research | Spring 11, 12, Winter 14, Summer 14 |
| Stochastic Processes I | Spring 14 |
| Math Modeling in Finance | Spring 14 |
| Math Modeling in Finance II | Fall 14 |
| Math Contest in Modeling | Winter 15 |

*Internships*

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| Internship in Mathematics | Summer 06 |

***University of Nevada, Reno***

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|---|---|
| Fundamentals of College Mathematics | Fall 98, 00 |
| College Algebra | Fall 00 |
| Calculus I | Spring 99 |
| Calculus II | Fall 98, Spring 99 |
| Introductory Calculus For Business and Social Sciences | Fall 00 |

***Colorado State University***

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| Calculus II | Fall 99 |
| Calculus III | Fall 99 |
| Ordinary Differential Equations | Spring 00 |
| Discrete Structures (course coordinator) | Spring 00 |

***Texas A&M University***

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| Business Mathematics I | Summer 92 |
| Business Mathematics II | Summer 97 |

## SERVICE

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| Professional | Reviewer for the journal *Advances in Computational Mathematics*, 2007. |
| | Reviewer for the journal *Computer Aided Geometric Design*, 2007. |
| | Reviewer for the journal *IEEE Transactions on Robotics and Automation*, 1994-95. |
| University | Diversity Committee (2003-06) |
| Department | Coordinator for Math Tutoring Center (2010-) |

## GRANTS

### Internal SPU grants

*Innovation Fund, $1,250, Winter2014.*

- Implement MAT 1010 College Algebra as a hybrid online class.

*Academic Renewal Grant, 1-credit summer stipend, Summer 2010.*
*Teaching and Technology Grant, $3,500, Summer 2010.*

- Coding and implementation of differential equations homework problems in WebAssign.

*New Course Development grant (with Brian Gill), 1-credit summer stipend, Summer 2008*

- This objective is to implement the automated online grading system WebAssign for use in Calculus sequence.

*Faculty Research Grant, 5-credit summer stipend, Summer 2006*

- Research Topic: *An Analysis of the Dimension of Bivariate Spline Spaces*

*Academic Renewal Grant (with Brain Gill, Robbin O'Leary, and Steve Johnson), 2-credit summer stipend, Summer 2004.*

- This objective is a partial redesign of the first two quarters of calculus to integrate the use of the computer algebraic system Maple into the instruction of the courses.

### External Grants Application (Not Awarded)

"Modeling of High Occupancy Toll (HOT) Lanes"
Center for Undergraduate Research in Mathematics, $5,000, 6/07-5/08.

- The objective is to construct mathematical models and perform simulations of the High Occupancy Toll Lanes. The project provides partial funding for two undergraduate students during the summer of 2007.