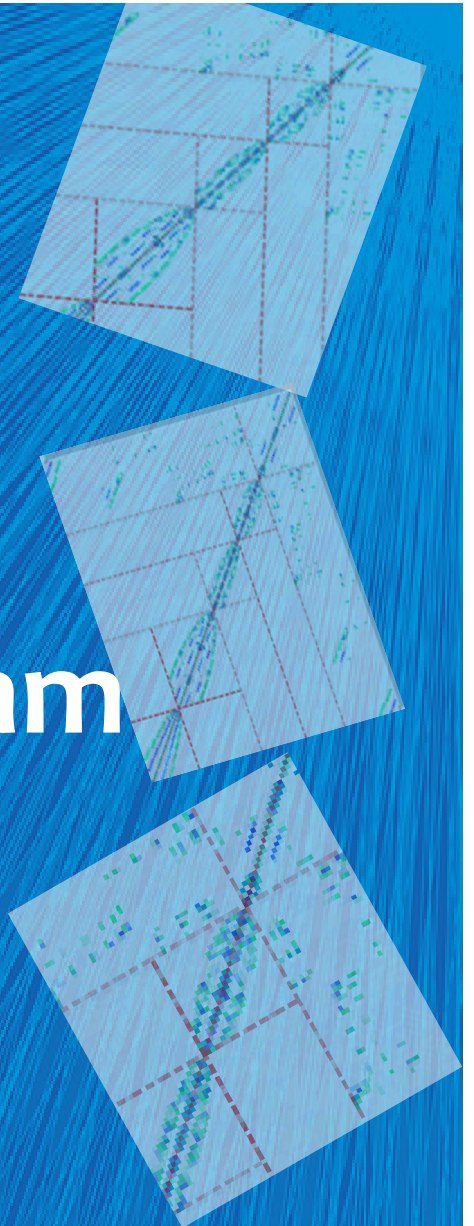


2017 International Conference on Preconditioning Techniques for Scientific & Industrial Applications

July 31- August 2, 2017
University of British Columbia,
Vancouver

Conference Program



Getting Started



Get connected: The "eduroam" network is available at UBC. Another option is the "ubcvisitor" network. Open up a web browser, and you will be directed to the login page.

FAQs

Q: Where are the sessions?

- Plenary sessions, except the morning plenary of Day 2, will be in the **Forest Sciences Centre (FSC) Room 1005**. The Tuesday morning plenary will be in the **Pharmaceutical Sciences Building (PHRM) Room 1101**.
- Breakout sessions, except the morning sessions of Day 2, will be in **FSC 1005, 1001, and 1613**. The Tuesday morning sessions will be in **PHRM 1101, 1201, and 3208**.
- You will find a copy of the building floors and a campus map at the end of the program.

Q: Will the program change? Program changes and updates will be announced during the conference, as necessary.

Q: Where can I go for help on site? If you need assistance or have a question during the conference, please feel free to talk to Chen Greif or Jessica Bosch.

Q: Where can I get refreshments and meals? For snacks or quick meals, visit <http://www.food.ubc.ca/feed-me/> or our website <http://www.cs.ubc.ca/~greif/precon17/map.html>. Coffee breaks are provided each day of the conference.

Q: Where can I get a cab to pick me up from the Venue? You can call Yellow Cab (604-681-1111) and request to be picked up at the intersection of Main Mall and Agronomy Road.

Q: How can I get around?

- **UBC Map link:** maps.ubc.ca/
- **Public Transit:** Feel free to search and plan your public transport rides by visiting <http://www.translink.ca/>, where directions, ticket costs and bus schedules are indicated.
- **Parking at UBC:** <http://www.parking.ubc.ca/visitor.html>

Q: What are the optional socials outside conference hours?

- **Fireworks:** There are fireworks starting at 10pm on July 29, August 2, and August 5. Please visit <http://hondacelebrationoflight.com/> for details. For other good spots visit <http://dailyhive.com/vancouver/places-to-watch-celebration-of-light-fireworks>.
- **City Running Tour:** This 7km sightseeing tour starts on July 30, at 9:30am at the main entrance of Opus Hotel, 322 Davie Street. If you wish to register, please click [here](#) and choose the date & time July 30th, 9:30am. On the payment page, redeem the promo code 'precon17' which gives you a \$10 discount, for a total of \$30 (CAD) after discount.

Q: What emergency numbers should I know?

- **Campus Security (604-822-2222);**
- **General Emergencies (911);**
- **UBC Hospital (604-822-7121).**

There will be photography throughout this event for promotional purposes for use by UBC. If, for any reason, you wish not to have your photo taken or used in this manner, please contact Chen Greif or Jessica Bosch.

Monday July 31, 2017

- 07:30 - 08:15 **Registration** (*FSC Atrium*)
- 08:15 - 08:30 **Opening Remarks:** **Chen Greif** (*FSC 1005*)
- 08:30 - 09:15 **Plenary:** **Michele Benzi** (*FSC 1005, Chair: Chen Greif*)
Iterative Solution of Double Saddle Point Problems
- 09:15 - 09:45 **Coffee Break** (*FSC Atrium*)
- 09:45 - 11:45 **Parallel Sessions:**

	Mini 1: Block Preconditioning, Part I <i>Room: FSC 1005</i> <i>Chair: Andy Wathen</i>	Mini 2: Preconditioning Methods and Theory Based on Matrix Splitting Iterations <i>Room: FSC 1001</i> <i>Chair: Zeng-Qi Wang</i>	Hierarchical and Multilevel Methods <i>Room: FSC 1613</i> <i>Chair: Geoffrey Dillon</i>
09:45-10:15	Michael Wathen An Approximate Inverse-Based Preconditioner for Incompressible Magnetohydrodynamics	Zhengda Huang On the Analysis of the HSS Method in Solving Partial Differential Equation	Geoffrey Dillon A Hierarchical Low-Rank Schur Complement Preconditioner for Nonsymmetric Linear Systems
10:15-10:45	Edward Phillips Block Preconditioning Approaches to Physics-Compatible Electromagnetics and Plasma Simulations	Hao Liu Newton-PCG Method for Solving Chandrasekhar's H-Equation	Yuval Harness Efficient Strong Hierarchical Matrix Preconditioning Strategies for Large Scale Elliptic Boundary Value Problems
10:45-11:15	Hisham bin Zubair Syed Multigrid Preconditioning Techniques for Geophysical Electromagnetics	Xi Yang A Relaxed Generalized-PSS Preconditioner for a System of Steady Incompressible Navier-Stokes Equations	Andrea Franceschini A Robust Multilevel Approximate Inverse Preconditioner for Symmetric Positive Definite Matrices
11:15-11:45	Daniel Szyld Multipreconditioned GMRES for Shifted Systems	Jun-Feng Yin On MHSS Iteration Method for the Space Fractional Coupled Nonlinear Schrödinger Equations	

- 11:45 - 13:30 **Lunch Break**
- 13:30 - 14:15 **Plenary:** **Tom B. Jönsthövel** (*FSC 1005, Chair: Andy Wathen*)
Taming the Many-Core Beast: a View from Industry on Impact of Changing Architectures on Preconditioner Design
- 14:15 - 15:00 **Plenary:** **Sander Rhebergen** (*FSC 1005, Chair: Andy Wathen*)
Preconditioners for Coupled Magma/Mantle Dynamics
- 15:00 - 15:30 **Coffee Break** (*FSC Atrium*)
- 15:30 - 17:30 **Parallel Sessions: (See page 3)**

15:30 - 17:30

Parallel Sessions:

	Mini 1: Block Preconditioning, Part II <i>Room: FSC 1005</i> <i>Chair: Michael Wathen</i>	HPC <i>Room: FSC 1001</i> <i>Chair: Serge Petiton</i>	Applications <i>Room: FSC 1613</i> <i>Chair: Chao Yang</i>
15:30-16:00	Jennifer Pestana Efficient Block Preconditioning for a C1 Finite Element Discretisation of the Dirichlet Biharmonic Problem	Serge Petiton A Distributed and Parallel Asynchronous Unite and Conquer Method to Solve Large Scale Non-Hermitian Linear Systems	Chao Yang Preconditioners for Electronic Structure Calculation
16:00-16:30	Niall Bootland Preconditioners for Two-Phase Incompressible Navier-Stokes Flow	Nahid Emad Spectral Graph Analysis with Unite and Conquer Approach	Gabriela Diaz POD-based Deflation Methods for Two-Phase Reservoir Simulation
16:30-17:00	Jessica Bosch Preconditioning for Two-Phase Flows	Cédric Chevalier Algorithms for Multi-Criteria Mesh Partitioning	Artur Safin A Finite Element Solution of the Thermoacoustic Equations for Modeling of Trace Gas Sensors
17:00-17:30	Walter Zulehner Robust Preconditioners for Optimality Systems - an Infinite-Dimensional Perspective	Tulin Kaman Strategies for the Development of Efficient, High-Order Accurate Residual Distribution Schemes for the Solution of Compressible Flow Problems	Niccolò Dal Santo Multi Space Reduced Basis Preconditioners for Large-Scale Parametrized PDEs with Applications to Blood Flow Simulations

17:30 - 19:30

Reception & Poster Event (CS Atrium)

- CPR-like Preconditioners for Large-Scale Linear Systems in Reservoir Simulations on GPU (*Bo Yang*)
- Boundary Layer Preconditioners for a Finite-Element Method (*Thai Anh Nhan*)
- Robust and Fast BiCG Method using SIMD-Accelerated DD Arithmetic (*Hidehiko Hasegawa*)
- ALIEN: Homogeneous Access to Linear Algebra Libraries (*Cédric Chevalier*)
- Preconditioned Newton-Krylov Methods for Model Predictive Control (*Andrew Knyazev*)
- Preconditioning for Diffuse Interface Tumor Growth Models (*Jessica Bosch*)
- Preconditioning the Elastic Wave Equation in 2D and 3D based on Inexact MSSS Matrix Computations (*Manuel Baumann & Yue Qiu*)
- Preconditioning in Reservoir Simulation (*Thomas Roy*)
- Distributed-Memory Hierarchical Interpolative Factorization (*Yingzhou Li*)

Tuesday August 1, 2017

08:30 - 09:15

Plenary: Alison Ramage (*PHRM 1101, Chair: James Nagy*)

A Multilevel Preconditioner for Data Assimilation with 4D-Var

09:15 - 09:45

Coffee Break (*PHRM Atrium*)

09:45 - 11:45

Parallel Sessions:

	Mini 3: Preconditioning Methods in Large-Scale Ill-Posed Inverse Problems, Part I <i>Room: PHRM 1101</i> <i>Chair: Lars Ruthotto</i>	Mini 4: Innovative Structured Preconditioners, Part I <i>Room: PHRM 1201</i> <i>Chair: Jianlin Xia</i>	Krylov Subspace Methods <i>Room: PHRM 3208</i> <i>Chair: Roland Herzog</i>
09:45-10:15	James Nagy Robust Regression for Mixed Poisson–Gaussian Model	Laurent Demanet 3D Helmholtz: What is the Right Algorithm?	Roland Herzog Preconditioned GMRES Revisited
10:15-10:45	Eran Treister A Hybrid Domain Decomposition and Shifted Laplacian Multigrid Preconditioner for the Elastic Helmholtz Equation	Eric Michielssen Butterfly-based Fast Direct Solvers for Highly Oscillatory Problems	Arielle Grim-McNally Recycling Preconditioners and Subspaces for Sequences of Linear Systems
10:45-11:15	Andreas Mang Preconditioners for the Reduced Space Hessian in Hyperbolic Optimal Control Problems	Yingzhou Li Oscillatory Integral Operators and Interpolative Butterfly Factorization	Manuel Baumann An Efficient Two-Level Preconditioner for Multi-Frequency Wave Propagation Problems
11:15-11:45	Wenke Wilhelms Mimetic Multiscale Preconditioners for Electromagnetic Simulations	Chao Chen A Distributed-Memory Hierarchical Solver for Sparse Matrices	Andrew Knyazev Preconditioned Spectral Clustering of Signed Graphs

11:45 - 13:30

Lunch Break & Group Photo

13:30 - 14:15

Plenary: Jed Brown (*FSC 1005, Chair: Yousef Saad*)

Practical and Efficient Time Integration and Kronecker Product Solvers

14:15 - 15:00

Plenary: Jie Chen (*FSC 1005, Chair: Yousef Saad*)

Fixed-Domain Asymptotics of Covariance Matrices and Preconditioning

15:00 - 15:30

Coffee Break (*FSC Atrium*)

15:30 - 17:30

Parallel Sessions: (See page 5)

15:30 - 17:30

Parallel Sessions:

	Mini 3: Preconditioning Methods in Large-Scale Ill-Posed Inverse Problems, Part II <i>Room: FSC 1005</i> <i>Chair: James Nagy</i>	Mini 4: Innovative Structured Preconditioners, Part II <i>Room: FSC 1001</i> <i>Chair: Eric Darve</i>	Block-Structured Systems <i>Room: FSC 1613</i> <i>Chair: Tyrone Rees</i>
15:30-16:00	Ana Maria Soane Multigrid Preconditioners for the Newton-Krylov Method in the Optimal Control of the Stationary Navier-Stokes Equations	Panayot Vassilevski Preconditioning Matrices by Diagonal Compensation with Rank One Matrices	Tyrone Rees Null-Space Preconditioners for Saddle Point Systems
16:00-16:30	Lars Ruthotto A Stabilized Multigrid Solver for Hyperelastic Image Registration	Pieter Ghysels A Robust and Parallel Approximate Factorization Preconditioner using Hierarchical Matrices and Randomized Sampling	Massimiliano Ferronato A Class of Block Preconditioners for Multi-Physics Coupled Problems
16:30-17:00	Scott MacLachlan Multigrid Methods for Regularized Problems	Qiang Ye Preconditioning for Accurate Solutions of Linear Systems and Eigenvalue Problems	Aurelio Oliveira Switching Preconditioners in a Hybrid Approach for Linear Systems arising from Interior Point Methods
17:00-17:30	Yue Qiu Low-Rank Methods for Computations of Posterior Covariance Matrices in Bayesian Inverse Problems	Jianlin Xia Effective and Robust Preconditioners for SPD Matrices via Structured Incomplete Factorization	

18:30 - 20:30

Conference Dinner (*University Golf Club*)

5185 University Blvd, Vancouver, BC V6T 1X5

Wednesday August 2, 2017

08:30 - 09:15 **Plenary: Nicole Spillane** (*FSC 1005, Chair: Daniel Szyld*)

Adaptive Multipreconditioning for Domain Decomposition

09:15 - 09:45 **Coffee Break** (*FSC Atrium*)

09:45 - 11:45 **Parallel Sessions:**

	Mini 5: Preconditioning in the Context of Radial Basis Functions, Part I <i>Room: FSC 1005</i> <i>Chair: Alison Ramage</i>	Mini 6: Application Driven Preconditioning and Accelerating Methods <i>Room: FSC 1001</i> <i>Chair: Hengbin An</i>	Multigrid Methods <i>Room: FSC 1613</i> <i>Chair: Raymond Tuminaro</i>
09:45-10:15	Rio Yokota A Hybrid FMM- H^2 -Matrix for Preconditioning Radial Basis Functions	Hengbin An Anderson Acceleration and Application to Neutron Transport Equation	Raymond Tuminaro Algebraic Multigrid Solvers for Thin-Domain Problems: Application to Ice Sheet Modeling
10:15-10:45	Jens Markus Melenk Thin-Plate Spline Interpolation: Convergence Analysis and H-Matrix Solution Techniques	Tao Cui Parallel Preconditioning Techniques for Electromagnetic Problems	Yunhui He Local Fourier Analysis of Block-Structured Multigrid Relaxation Schemes for the Stokes Equations
10:45-11:15	Jie Chen A Novel Class of Covariance Functions and Linear-Cost Matrix Computations	Hui Liu Scalable Multi-stage Preconditioners for Numerical Simulations of Multi-Phase Flow in Porous Media	Daniel Osei-Kuffuor Multigrid Reduction for Coupled Linear Systems with Applications to Multiphase Flow
11:15-11:45	Sabine Le Borne Comparison of Analytically and Algebraically Constructed Low Rank Approximations in Kernel-based Scattered Data Interpolation	Xiaowen Xu An Adaptive Preconditioning Strategy for Large-Scale Multi-Physics Simulations	

11:45 - 13:30 **Lunch Break**

13:30 - 14:15 **Plenary: Eric Darve** (*FSC 1005, Chair: Esmond Ng*)

Low-Rank Factorization Algorithms for Kernel Matrices

14:15 - 14:30 **Coffee Break** (*FSC Atrium*)

14:30 - 16:30 **Parallel Sessions (See page 7)**

14:30 - 16:30

Parallel Sessions:

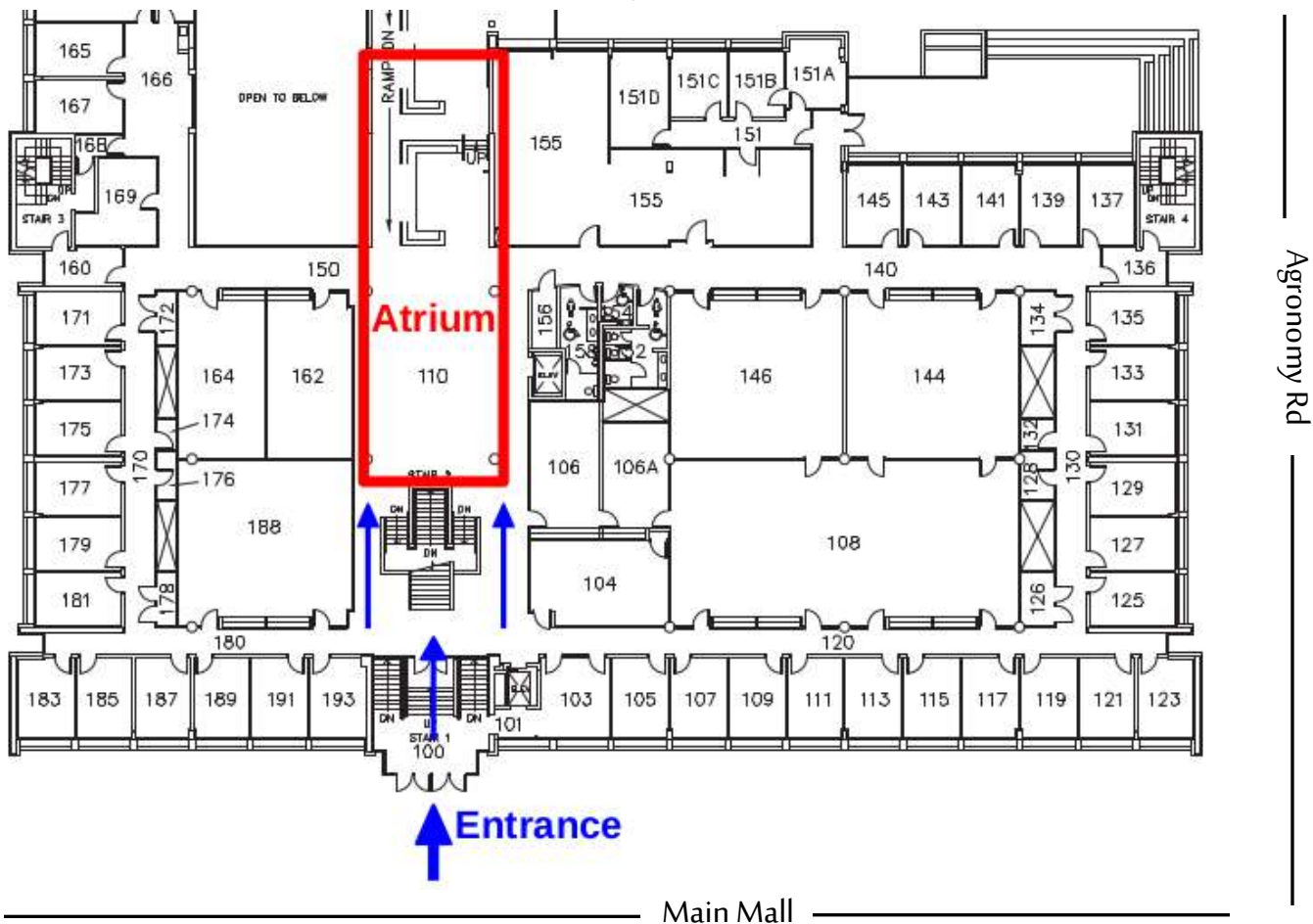
	Mini 5: Preconditioning in the Context of Radial Basis Functions, Part II <i>Room: FSC 1005</i> <i>Chair: Sabine Le Borne</i>	Domain Decomposition Methods <i>Room: FSC 1001</i> <i>Chair: Edmond Chow</i>
14:30-15:00	Patricio Farrell How to Make Multilevel RBF Collocation More Efficient	Edmond Chow Asynchronous Iterative Solvers and Preconditioners
15:00-15:30	Benedikt Diederichs New Estimates for Condition Numbers of Radial Basis Function Interpolation Matrices	Carlos Echeverria Serur Convergence of the Multiplicative Schwarz Method for Convection-Diffusion Problems Discretized on a Shishkin Mesh
15:30-16:00	Elisabeth Larsson Preconditioning for Radial Basis Function Partition of Unity Methods	Victorita Dolean Nonlinear Preconditioning: How to use a Nonlinear Schwarz Method to Precondition Newton's method
16:00-16:30	Erin Claire Carson Preconditioned GMRES-based Iterative Refinement for the Solution of Sparse Ill-Conditioned Linear Systems	

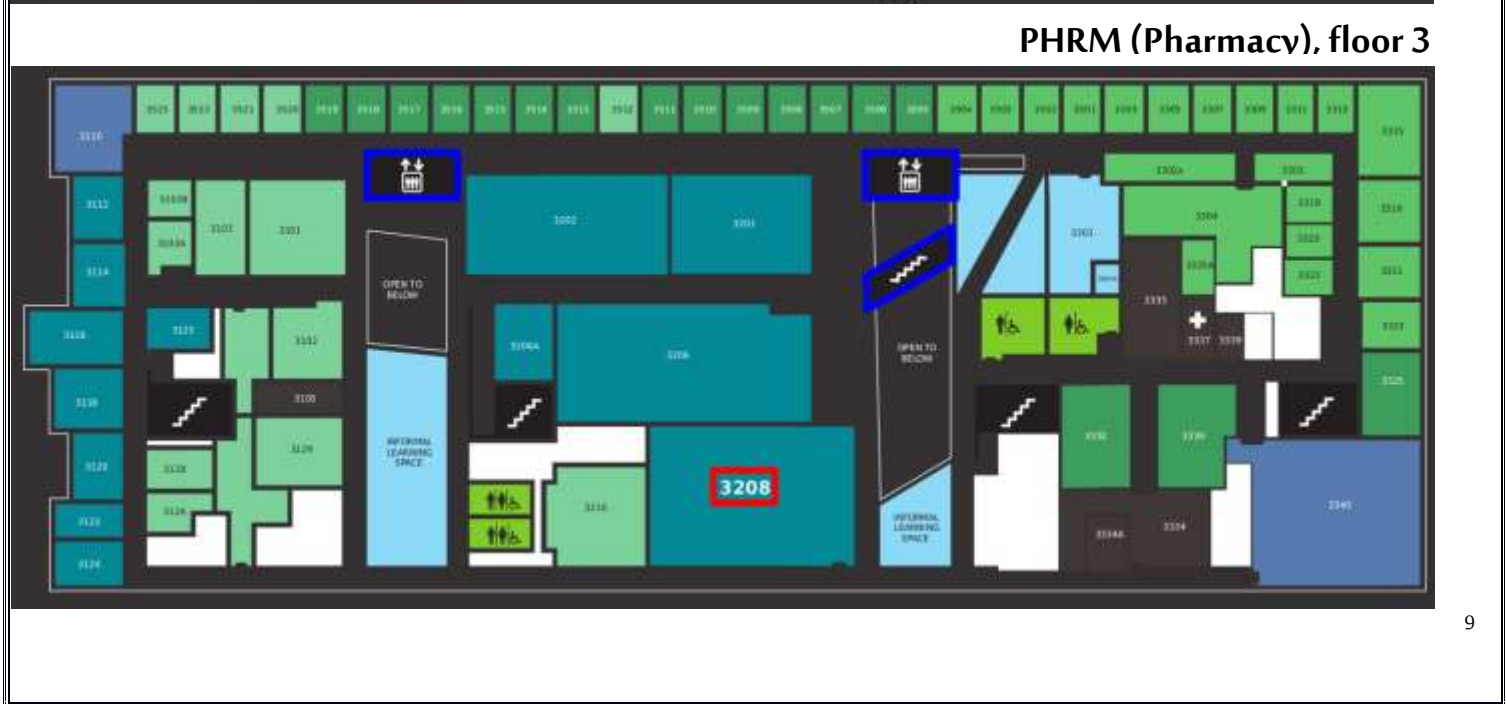
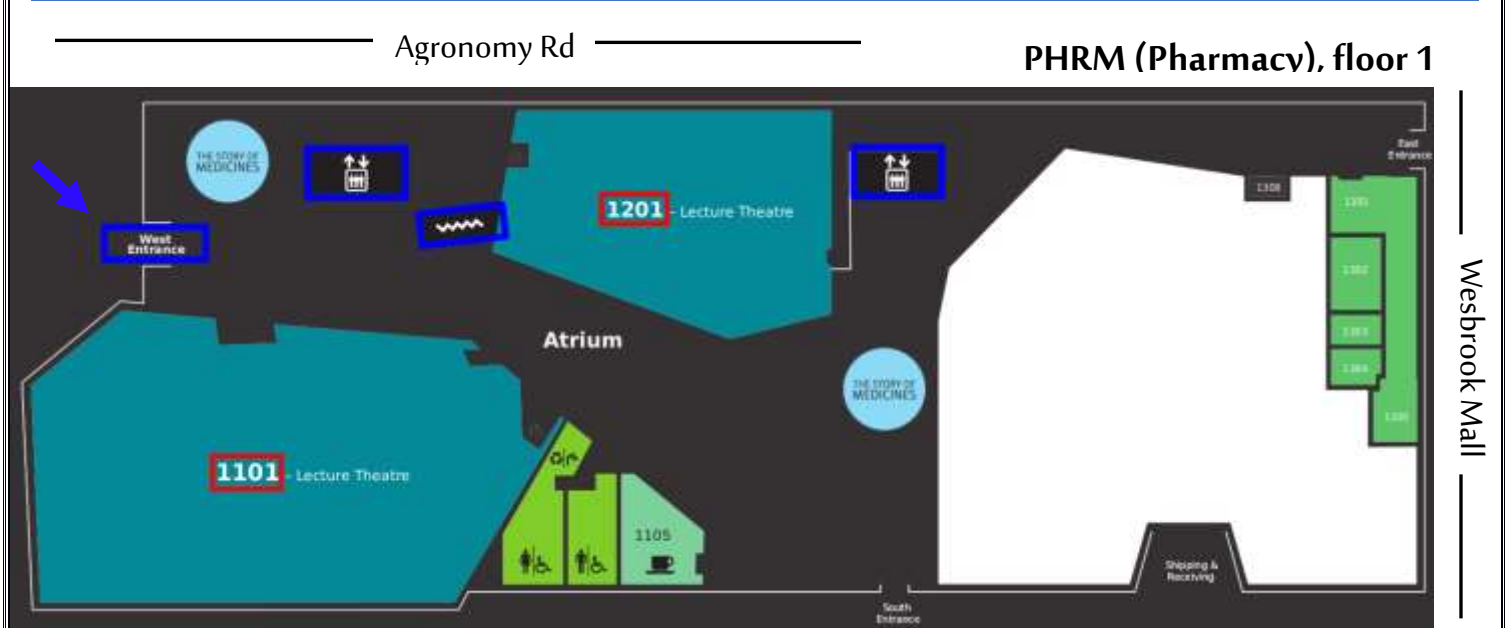
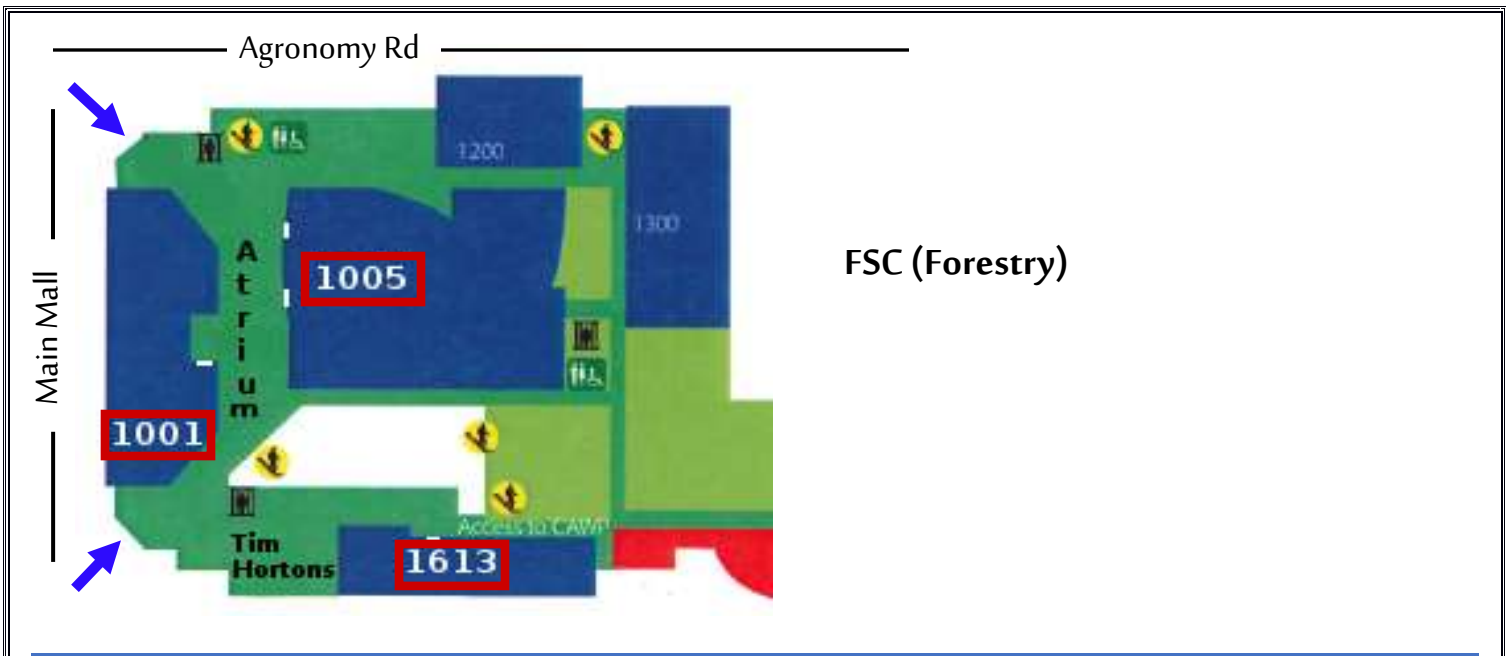
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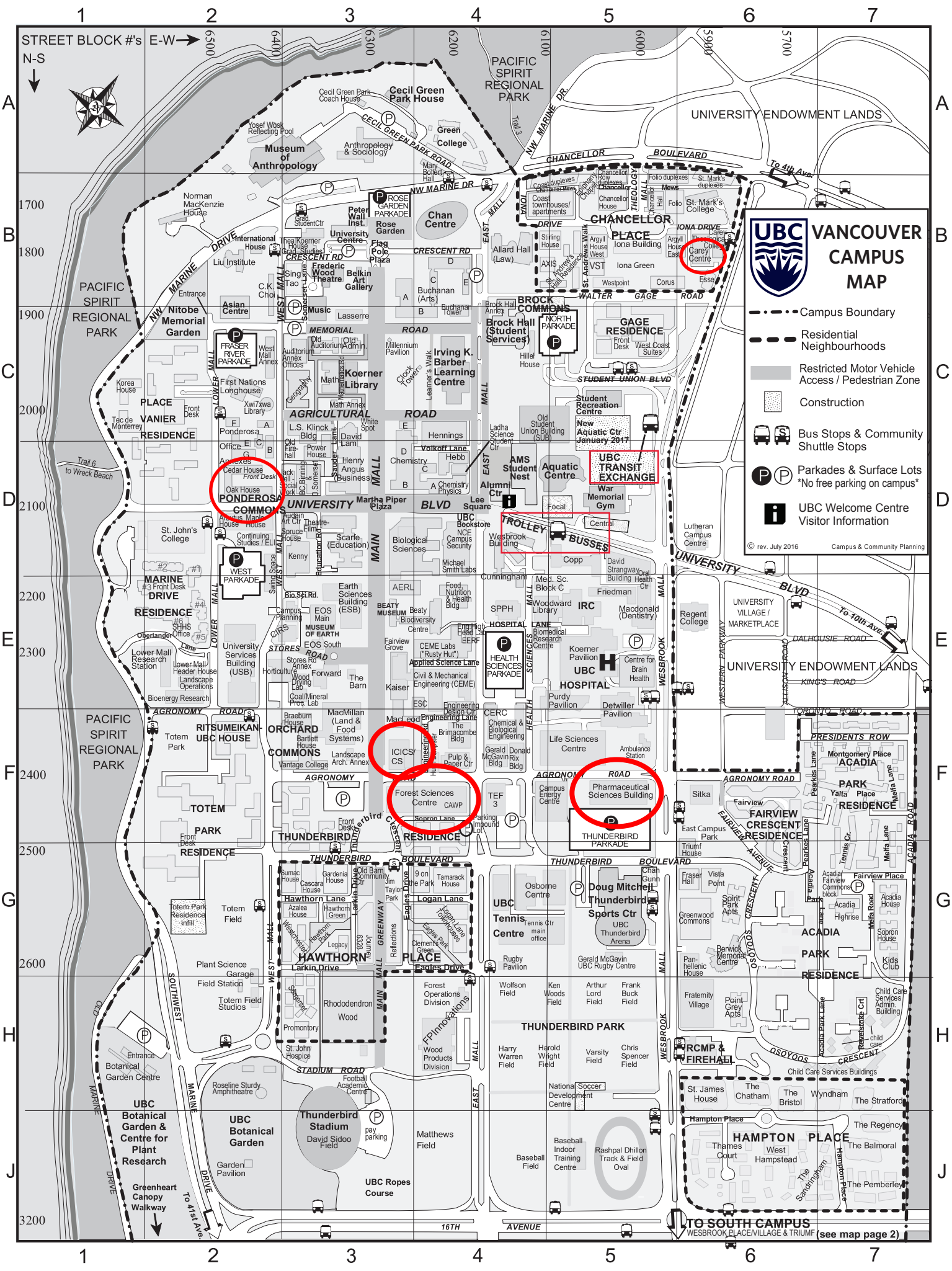
Campus Map & Room Guide: Computer Science/ Forestry/ Pharmacy



CS (Computer Science)







UBC VANCOUVER CAMPUS MAP

- Campus Boundary
- Residential Neighbourhoods
- Restricted Motor Vehicle Access / Pedestrian Zone
- Construction
- Bus Stops & Community Shuttle Stops
- Parkades & Surface Lots
No free parking on campus
- UBC Welcome Centre Visitor Information

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1 2 3 4 5 6 7

STREET BLOCK #s E-W →

N-S ↓

1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
3200

16TH AVENUE

TO SOUTH CAMPUS
WESBROOK PLACE VILLAGE & TRIUMF (see map page 2)

1 2 3 4 5 6 7

