# Quantum Computing Materials Challenges

## Monday August 27, 2018

8:00–8:50 *Check-In/Light Breakfast (Hosted by IPAM)*

8:50–9:00 *Welcome and Opening Remarks*

9:00–9:40 **Matthias Troyer** (Microsoft Research)
*Quantum Computing Materials Challenges*

10:00–10:15 *Break*

10:15–10:55 **Yoshihisa Yamamoto** (Stanford University)
*Physics of quantum-to-classical crossover and coherent Ising machines*

11:15–11:30 *Break*

11:30–12:10 **Garnet Chan** (California Institute of Technology)
*Classical and quantum simulations of quantum materials*

12:30–2:30 *Lunch (on your own)*

2:30–3:10 **Eric Cances** (École Nationale des Ponts-et-Chaussées)
*What can applied mathematicians do for you?*

3:30–4:00 *Break*

4:00–4:40 **Edwin Barnes** (Virginia Tech)
*Modeling and cancellation of noise in semiconductor quantum dot spin qubits*

5:00–6:30 *Poster Session & Reception (Hosted by IPAM)*

## Tuesday August 28, 2018

8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*

9:00–9:40 **Markus Reiher** (ETH Zurich)
*What is required for solving chemical problems on a quantum computer?*

10:00–10:15 *Break*

10:15–10:55 **Bela Bauer** (Microsoft Station Q)
*Dynamics of Majorana-based qubits*

11:15–11:30 *Break*

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11:30–12:10 **Roman Lutchyn** (Microsoft Research)
*Scalable Designs for Quasiparticle-Poisoning-Protected Topological Quantum Computation with Majorana Zero Modes*

12:30–2:30 *Lunch (on your own)*

2:30–3:10 **Susan Coppersmith** (University of Wisconsin-Madison)
*Building a Quantum Computer Using Quantum Dots in Silicon/Silicon-Germanium Heterostructures*

3:30–4:00 *Break*

4:00–4:40 **Hidetoshi Nishimori** (Tokyo Institute of Technology)
*Performance enhancement of quantum annealing by non-traditional quantum driving*

## Wednesday August 29, 2018

8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*

9:00–9:40 **Rick Muller** (Sandia National Laboratories)
*Modeling quantum and nanoscale semiconductor electronic devices*

10:00–10:15 *Break*

10:15–10:55 **Yasuyuki Kawahigashi** (University of Tokyo)
*Topological phases of matter, modular tensor categories and operator algebras*

11:15–11:30 *Break*

11:30–12:10 **Sophia Economou** (Virginia Tech)
*Defects in SiC: Electronic structure, spin control, and spin-photon interfaces*

12:30–2:00 *Lunch (on your own)*

2:00–2:30 **Zhenghan Wang** (Microsoft Research)
*Qubit Materialization Challenges: Rise above the Noise*

2:30–3:30 *Discussion led by Eric Cances & Mitchell Luskin*