COMPUTATIONAL FINANCE & RISK MANAGEMENT

UNIVERSITY of WASHINGTON

Department of Applied Mathematics

Quantitative Development at the University of Washington Dept of Applied Mathematics

NWCPP Meeting, February 2020

Disclaimer

- Personal introduction to our programs, provided to NWCPP
- Not an “official” presentation on behalf of the Department of Applied Mathematics, University of Washington

UW Department of Applied Mathematics

- Graduate programs
  - MSc Applied Math
    - On campus and online
    - https://amath.washington.edu/master-science-applied-mathematics
  - MSc Computational Finance & Risk Management (CFRM)
    - Also on campus and online
    - http://cfrm.uw.edu/
  - PhD Applied Math
    - https://amath.washington.edu/phd-program

- Undergraduate programs – starting 2020-21
  - BSc Applied Math
    - https://amath.washington.edu/minor-applied-mathematics
  - BSc CFRM
    - https://amath.washington.edu/undergraduate-major-applied-mathematics
  - Applications now being considered (deadline mid-April)

Research Areas

- Scientific computing
- Modern mathematical methods
- Application areas
  - mathematical biology
  - nonlinear waves and coherent structures
  - mathematical finance
  - medical imaging
  - climate modeling

- Strong emphasis on scientific computing
  - Python
  - R
  - Julia
  - C++

With Respect to C++

- Interpreted languages (eg R and Python)
  - Reach their limit quickly
  - Require massive scaling on distributed systems for sophisticated research

- An opportunity for modern C++
  - Is used, but not nearly as much as R and Python
  - Julia?
  - Post-C++11
    - Far easier to implement mathematical models now
    - Even better with C++20
  - Interfaces with Python and R – delegate the number crunching to C++
  - Ongoing and future work with researchers and PhD students – Developing

Quant Finance/QuantDevHacks

- Have been working on building up opportunities for CFRM students
- pybind11 project released (Steven Zhang)
  - https://github.com/QuantDevHacks/Python2Cpp
- Cutting edge statistical distribution research for financial modeling
  - Random number generation conformant with C++11
  - PDF, CDF, quantile functions per Boost standards
- Date class and day count utilities built on C++20 to be released soon
- Scenario generation library in progress

- Support/input from NWCPP more than welcome!
  - Try our stuff, kick it in the tires, constructive criticism
  - Mentoring opportunities
  - Ad hoc help with advanced C++ methods and new language features

That’s it – THANK YOU!!!

hansondj@uw.edu