Submittee: Andrew Rechnitzer
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Title: 2018 Workshop on Approximate Enumeration of Polygons, Polymers and Link Diagrams sponsored by the PIMS CRG in Applied Combin
Event Type: Conference-Workshop

Location:
Department of Mathematics, University of British Columbia, Vancouver, Canada.

Dates:
23-25 March 2018

Topic:
Approximate Enumeration of Polygons, Polymers and Link Diagrams

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Methodology:
This was a training workshop directed toward graduate students. The workshop started with trainees giving brief introductory presentations to introduce themselves and their relevant research interests/open problems to other participants. Following this were four tutorials lead by four presenters - Patrick Walls (UBC), Andrew Rechnitzer (UBC), Harrison Chapman (CSU) and Rob Scharein (Hypnagogic Software).

All tutorials were held in a new interactive classroom (Room 121 in the LSK building) at UBC. Presentations were given using Jupyter and/or Knotplot and participants used their own laptops to work on hands-on excercises that involved writing python code or using the Knotplot program.

Objectives Achieved:
A group of motivated graduate students, postdocs and faculty were introduced to important cutting-edge approaches for solving approximate enumeration problems related to the embedding complexity of knots and links. These same methods also enable the efficient sampling of these objects.

These problems are motivated by applications to physics, chemistry, molecular biology as well as knot theory. In particular, participants learned about python programming and Wang-Landau sampling along with specific tools that will be useful to them in Knotplot.

Scientific Highlights:
Several participants immediately applied what they learned to open problems they brought to the workshop. Thereâ€™s no doubt that this will lead to advancement on their thesis work and journal articles in the near future.

Organizers:

* Arsuaga, Javier = Mathematics & Molecular and Cellular Biology = UC Davis
* Rechnitzer, Andrew = Mathematics = UBC
* Shimokawa, Koya = Mathematics = Saitama University, Japan
* Soteros, Chris = Mathematics = U. Saskatchewan
* Vazquez, Mariel = Mathematics & Molecular and Cellular Biology= UC Davis

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Speakers:

Tutorials run by

* Patrick Walls, Mathematics, UBC = Data analysis and visualisation using python
* Andrew Rechnitzer, Mathematics, UBC = Approximate enumeration and Wang-Landau sampling - a pythonic introduction
* Harrison Chapman, Mathematics, Colorado State University = Monte Carlo simulation of knot diagrams
* Rob Scharein, Hypnagogic Software = Advanced knot visualisation and experimentation using knotplot.

Links:

https://math.usask.ca/~soteros/ApproximateEnumerationTraining.html

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