



**BERKELEY LAB**  
LAWRENCE BERKELEY NATIONAL LABORATORY



# **Designing and Presenting a Science Poster**

## **Computing Sciences Summer Student Program**

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**June 29, 2017**

# Poster Sessions at Major Conferences

- Sessions for attendees to mingle in an around posters and presenters
- Posters usually viewable any time the conference is in session
- Often there is a poster session or reception
- Often 100s of posters are presented



# Presentations vs. Papers

## Papers

- Single preplanned narrative
- Text & figures
- Remote audience
- Reader can study in their own time
- Few to many pages
- Limited interaction
- Supporting material can be conveniently linked, e.g. references, URLs

## Presentations

- Single preplanned narrative
- Speech
- Captive audience
- 15+ minutes
- Multiple “slides”
- Fixed mode of interaction

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## Posters

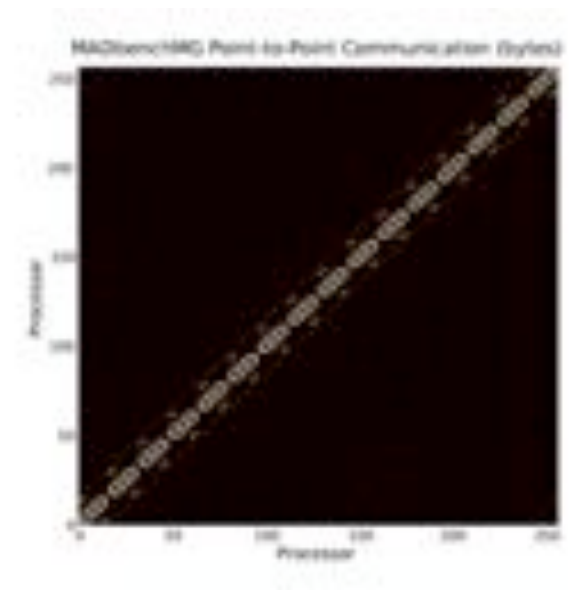
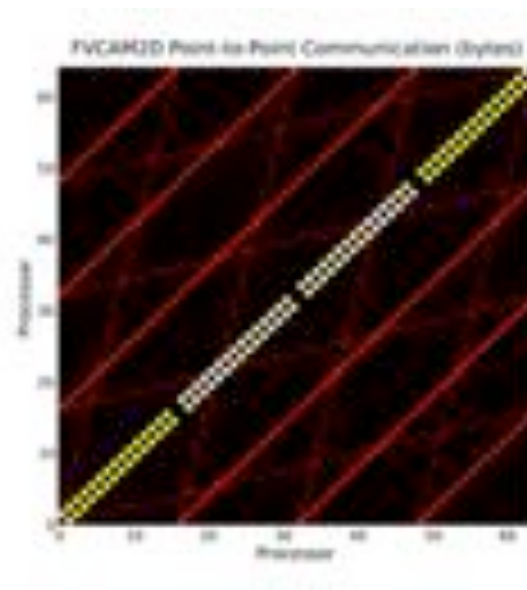
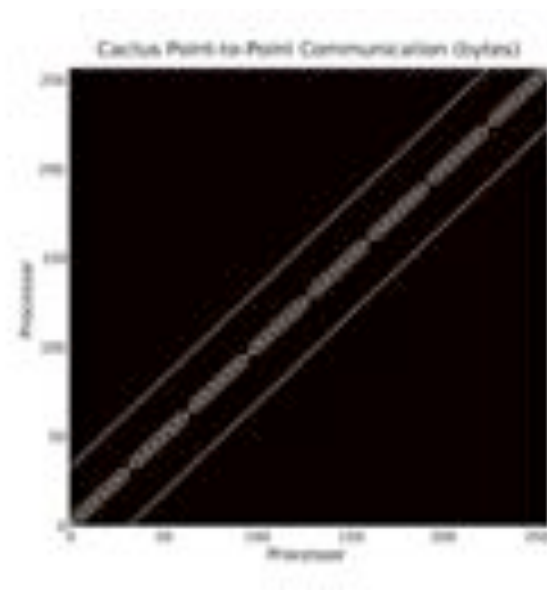
- Discussion
- Multiple narratives
- Browsing audience
- ~5 minutes per discussion
- Single “slide”
- Supporting material can be provided, e.g. paper, tablet device, demo, etc.

# Basic Poster Content

- **Title**
  - Briefly convey the subject matter
  - Attract interest without gimmicks
- **Introduction**
  - Problem Statement (why it matters), avoiding as much jargon as possible
- **Methodology**
  - Not too much detail, graphics work well in many cases
- **Results**
  - What worked, what didn't
  - Brief data analysis
- **Conclusions**
  - Your interpretations (Don't repeat results)
  - Further work
- **Citations**
- **Acknowledgements**
- **Contact information!**

# Visual Communication

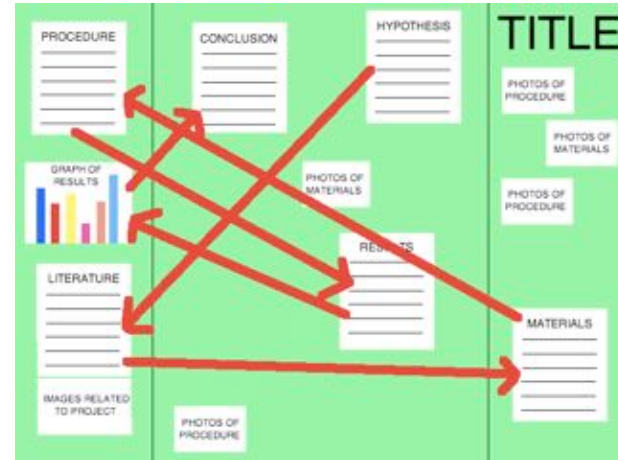
- Graphics to help you talk to your work
- Label graphs and charts legibly, and clearly enough that the label stands on its own
- Use different portions of poster to engage at different level of abstraction and separate logical concepts



# Things to Avoid

<http://sciencefair.math.iit.edu/display/layoutflow/>

- **Too verbose**
  - Aim for 500-700 words
- **Avoid large blocks of text**
  - Consider using lists
- **Avoid over-crowded or busy layouts**
  - Flow is often confusing, or the eye doesn't know where to look
- **Avoid garish color schemes or awkward font choices**
  - Dark backgrounds can print poorly



<http://bonfx.com/bad-typography/>

**COUNTRY MANOR:**  
**SPACIOUS. RESTFUL.**  
**RELAXING. QUIET.**

# Bad Poster Bingo by Zen Faulkes

Different parts of poster don't line up	Boxes within boxes	Zigzag reading order	More than three <b>typefaces</b>	Long-winded title
Gradient fills in coloured boxes	Big blocks of text	Photographic background	Unlabelled error bars on graphs	Pixelated pictures
More than five colours	Institutional logos bookending title	Free space	ALL CAPITALS	Text with shadows, outlines, or bevels
Abstract	<u>Underlined text</u>	Comic Sans	3-D graphs	Checking tablet or phone during presentation
Tables showing data that could be in a graph	Poster does not fit on poster board	Comic Sans (it's that annoying)	Objects almost touching or overlapping	Tiny, unreadable type

# Marketing Your Poster

- Make your poster compelling so it will stand out
  - “Title should be visible from the moon”
- Look like you want people to stop and talk
- Don’t stand in front of your poster
- Make room for multiple visitors
- Talk to your visitors as opposed to your poster
- Think about auxiliary materials, e.g QR-codes, handouts
- Perhaps?

Coordinate your outfit with your poster: Keegan, D.A., and S.L. Bannister. 2003. Effect of color coordination of attire with poster presentation on poster popularity. *Canadian Medical Association Journal* 169:1291-1292

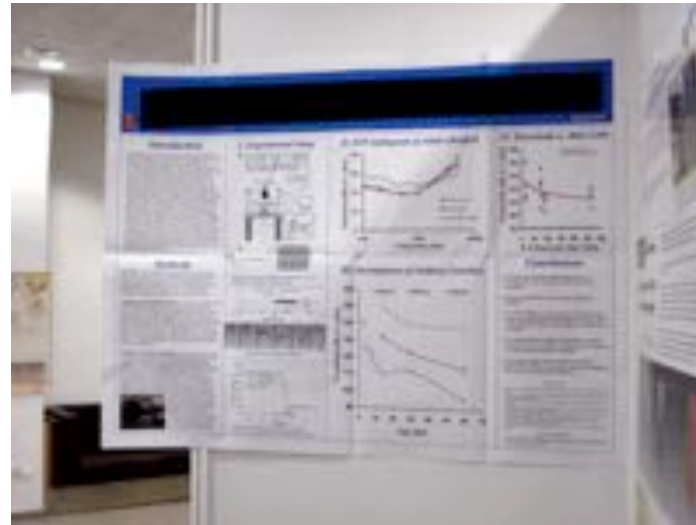
<http://betterposters.blogspot.com/2012/03/colour-clash.html>



Pink Guy with Pink Poster. Nicole Barker.

# Follow Poster Session Instructions

- Note format and size requirements
- Put up and take down your poster in a timely manner



# Software

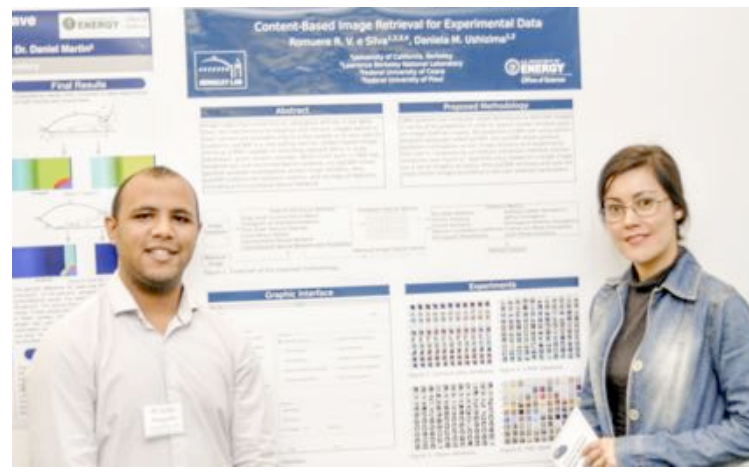
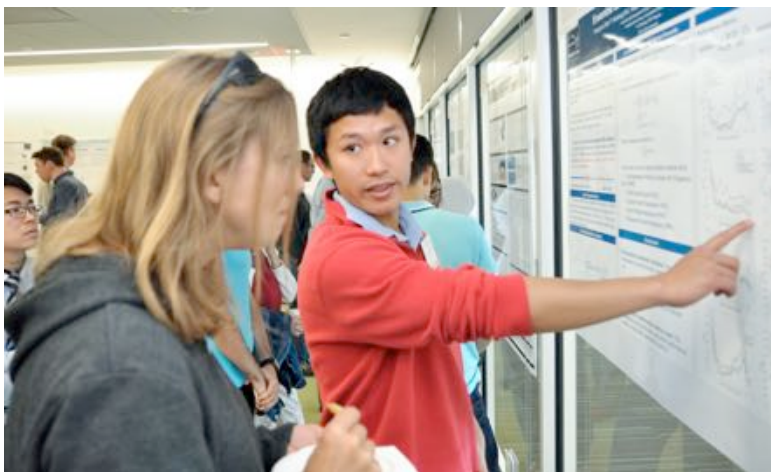
- **Microsoft Powerpoint**
  - Frequent choice, optimized for slides rather than posters
- **Google Slides / Drawings**
  - Free with LBL account
  - Slides is similar to Powerpoint, Drawings is page composition software
- **LaTeX (many templates available)**
  - Favorite of mathematics typesetters
  - Open source
- **Scribus, Inkscape**
  - Page composition software
  - Open source
- **OmniGraffle (Mac and iOS)**
  - Primarily image generation
  - Limited feature version available free
- **PosterGenius**
  - Designed for posters
  - Free trial available

# Resources

- **Colin Purrington, Swarthmore College**
  - <http://colinpurrington.com/tips/posterdesign>
  - Suggestions for software, templates, and more...
- **Zen Faulkes**
  - <http://betterposters.blogspot.com>
  - Advice and poster critiques
- **George Hess, Kathryn Tosney, and Leon Liegel, North Carolina State University**
  - <http://www.ncsu.edu/project/posters/>
  - Suggestions on formats, style, poster elements, etc.
- **Michael Barton, Bioinformatics Zen**
  - <http://www.bioinformaticszen.com/post/genotype-from-phenotype/>
- **Many YouTube videos...**

# CS Summer Student Program Poster Session

- August 3<sup>rd</sup>, 10:00-12:00
- Bldg 59, Room 3101
- We expect ~40 posters
- High visibility for lab scientists in CS and elsewhere in the lab



Computing Sciences

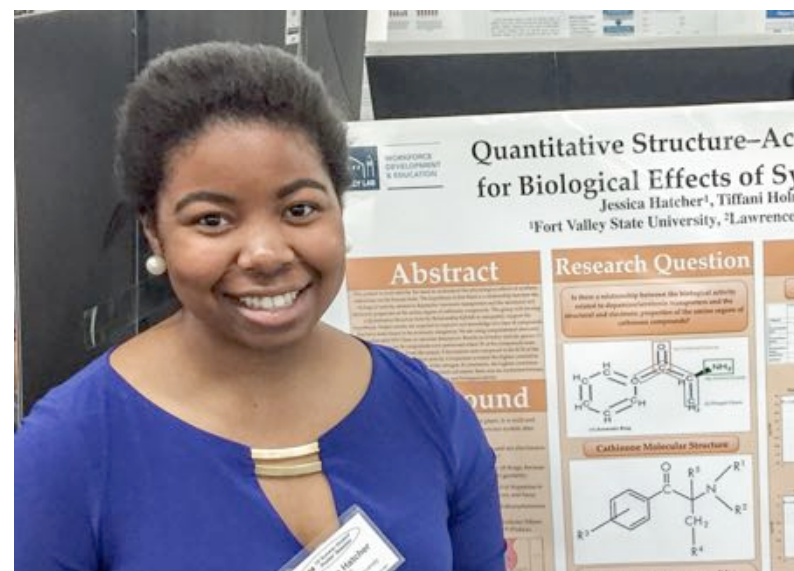
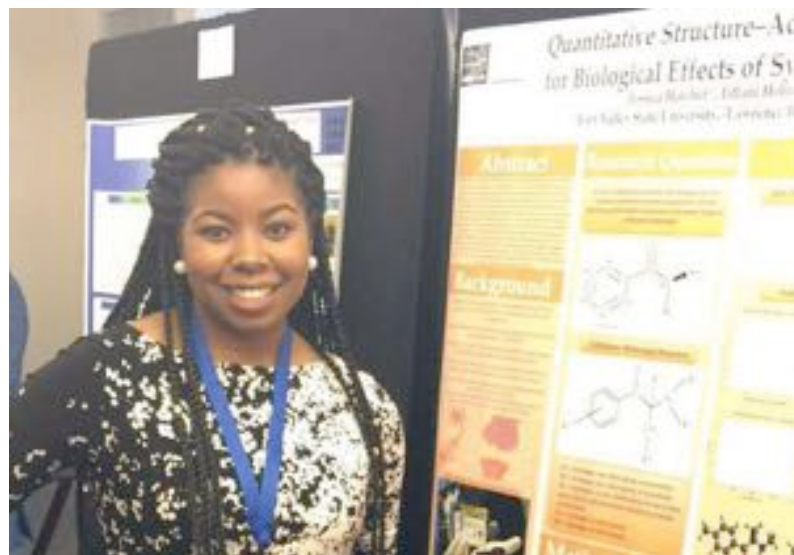


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# CS Summer Student Program Poster Session

- A great way to practice poster design and presentation

Jessica Hatcher from Fort Valley State University in Georgia won a first place award for her research poster “Quantitative Structure Activity Relationships (QSAR) for Biological Effects of Synthetic Cathinones” at the 74th Joint Annual Meeting of The National Institute of Science / Beta Kappa Chi National Scientific Honor Society



# Fabrication

- Print your poster in small form and check it carefully
- Posters will be attached to the wall or on poster boards
- We can accommodate more portrait posters than landscape
- We can print 4' by 3' posters from a high-resolution pdf file
- You will receive email from Osni Marques and Teresa Montero on signing up for the poster session and instructions on how to get your poster printed

# Examples

# WHICH IS MORE IMPORTANT: NUMBER OF PATCHES OR CONNECTIVITY?

Darin Kalisak, PBS Student

Contact: dkalisa@unity.ncsu.edu

## INTRODUCTION AND OBJECTIVES

Metapopulation conservation efforts with limited resources would benefit from a clear understanding of the effects of different conservation strategies, so that the conservationists can decide how to best spend their resources. In particular, in metapopulations with randomly occurring patch extinction and recolonization, it is desirable to know what conservation strategy is more effective: is it better to spend effort to add new patches to the metapopulation, or is it better to spend that effort to facilitate migration between patches?

As an aid to real-life conservation efforts, this model might be useful in weighing various strategies. For example, if the conservation choices for an endangered species are either to buy land to connect existing habitats (increasing connectivity), or to simply work to preserve multiple habitats (increasing number of patches), the model may avoid a solution which is economically preferable but ecologically ineffective.

I developed a simple metapopulation model to investigate this issue. I ran the model using varying numbers of patches, where each patch is considered to be either extinct or occupied, and where every pair of patches is either connected or disconnected for purposes of migration. The whole metapopulation is considered to be extinct if all patches are extinct.

Assumptions and Limitations

## ASSUMPTIONS AND LIMITATIONS

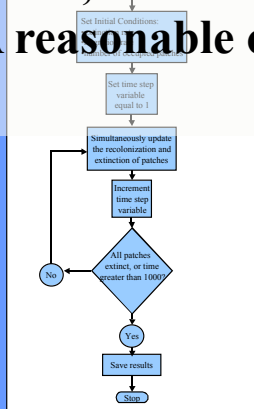
• Starting patch habitation was randomly determined, and so the results may not correspond well to specific species metapopulations with known starting conditions.

• All patches were assumed to be either fully occupied or extinct, and of equal value to the metapopulation.

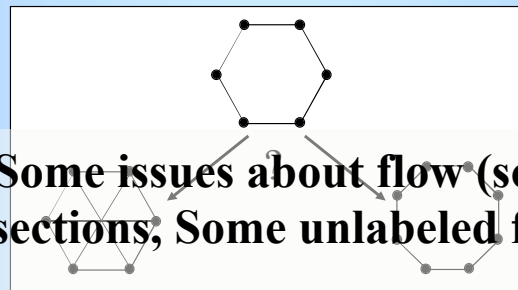
• All migration pathways were equivalent, regardless of spatial distances or other factors involved.

• The model had a low resolution for differing probabilities of extinction and migration.

• The model amalgamated results from differing extinction and migration probabilities within a number of patches. It is possible that for specific parameter values, this amalgamation will hide results contrary to the overall trend reported here.



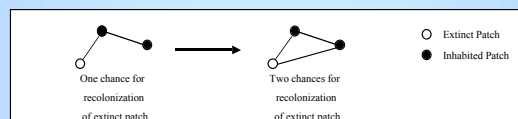
## THE ISSUE



Is the long-term viability of the metapopulation helped more by adding new patches or by increasing the number of migration pathways between existing patches?

Adding patches increases the overall population of the organism, and makes a total extinction less likely by increasing the sheer number of patches which would have to go extinct.

Adding migration pathways increases the likelihood of recolonization of extinct pathways, by giving extinct patches more sources for immigration.

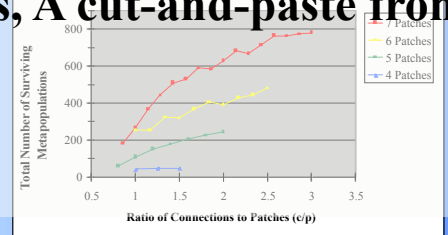


## RESULTS

I tested the model by running simulations which varied over four parameters:

- number of patches (values 4, 5, 6, and 7)
- minimally connected to maximally connected (expressed as the ratio of migration pathways to number of patches, or  $c/p$ )
- time-step-extinction probabilities of 2, 4, 6, and 8
- time-step-migration probabilities of 2, 4, 6, and 8

For every combination of these parameters, I ran 100 simulations of 1000 time-steps each, and tracked the number of instances out of those 100 runs that the metapopulation did not go extinct. For each number of patches, I then summed the numbers of surviving metapopulations for each connection ratio to obtain a summary value for each patch/pathway configuration. The results are graphed below. The model showed that increasing the number of patches by only one patch had a far greater effect on metapopulation survival than did increasing the connectivity between patches. A horizontal line intersecting two result curves would, at each intersection, show the ratio of connectivity necessary to achieve the same survival rate for each of the two metapopulations. In every case, the metapopulation with the greater number of patches required a lower ratio of connectivity to achieve the same survival rate. The model also showed that adding a single patch



## CONCLUSIONS

The results of this model indicate that, when possible, adding patches to a metapopulation is far preferable to incremental increases in numbers of migration pathways. There are some cases in which substantial gains in numbers of pathways can improve the long term viability of the metapopulation compared to addition of a patch. When the costs of these additional pathways is relatively low, this may be a good strategy, however in most cases the greatest benefit to the metapopulation will come from adding more patches.

It is worth noting that in our results, the curve for each additional patch is steeper than the last. It may be that the low numbers of patches I tested are an important limit on the effects of connectivity. Simulations using larger numbers of patches may show that increased connectivity can have a greater effect on metapopulation survival than is seen here.

G.R. Hess, K. Tosney, and L. Liegel. 2010. Creating Effective Poster Presentations. <http://www.ncsu.edu/project/posters>

Computing Sciences



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**PIGS IN SPACE:  
EFFECT OF ZERO GRAVITY AND  
AD LIBITUM FEEDING ON WEIGHT  
GAIN IN CAVIA PORCELLUS**

Colin B. Purrington\*  
6673 College Avenue, Swarthmore, PA 19081 USA

**ABSTRACT:**  
One ignored benefit of space travel is a potential alleviation of obesity, a chronic problem for a growing majority in many parts of the world. In theory, when an individual is in a condition of zero gravity, weight is eliminated, reduced, or space (the food) is infinitely below ad libitum feeding and related stressors are gone, and the only side effect would be that need to upgrade (and possibly "sanitize" reusable parts). But because doing this requires that all very good features only to be found in

**INTRODUCTION:**  
The current obesity epidemic started in the early 1980s with the invention and proliferation of elevator and related obesity theory, which released humans from the rigid constraints of clothes and permitted monthly weight gain without the need to buy new clothes. Indeed, evidence today for hundreds of million people involves only the act of leaving one's pants in public places, because the immediate pressure forces for immediate to

**MATERIALS AND METHODS:**  
One hundred male and one hundred female Duroc pigs (Cavia porcellus) were transported to the International Space Laboratory in 2010. Each pig was housed separately and provided of ad libitum wheats and fresh fruits and vegetables for 18 months. Each month, pigs were individually weighed by duck-taping them to an electronic balance sensitive to 0.0001 grams. Back on Earth, an identical cohort was similarly maintained and weighed. Data was analyzed by statistics.

**RESULTS:**  
Mean weight of pigs in space was 0.0001 ± 0.0001 g. Some individuals weighed less than zero, some more, but these variations were due to reaction to the duck tape, we believe, which caused them to be stressed push freely against the tape while in the balance. Individuals on Earth, the control cohort, gained about 240 pounds (g) ± 0.0001. Males and females gained a similar amount of weight on Earth the mean of effect of sex, and one at any point during the study was noted as starting size which was used as a baseline in the WACOV. Both Earth and space pigs developed substantial obesity, obesity onset and work schedule at the conclusion of the study.

**CONCLUSIONS:**  
Our idea that weight and weight gain would be zero in space was confirmed. Although we have not replicated this experiment on larger animals or primates, we are confident that our result would be mirrored in other model organisms. We are currently in the process of obtaining necessary human trial permissions, and should have our planned experiment initiated within 80 years, pending expedited review by local and Federal ARMs.

**ACKNOWLEDGEMENTS:**  
I am grateful for generous support from the National Research Foundation, Black Hole Diet Plans, and the High Fructose Sugar Association. Transport flights were funded by SPACE-EXES, the consortium of ships shipped from heavenly swaths space-flight startups. I am also grateful for comments on early drafts by Mahave Atlantic Club, Corpus Christi, USA. Finally, thanks to the Coy Foundation for generously donating animal care after the conclusion of the study.

**LITERATURE CITED:**  
NASA. 1982. Project STS-51-L: Duroc Pigs. Unpublished report.  
Gibson, S.E., D. D. Lusk, and N. M. Neumann. 2005. The Fetus Cannot Exercise Like An Adult: Obesity Loading in Neonatal Fat The Physiological Development During Gestational Half Of Pregnancy. Medical Hypotheses 58:221-228.  
Rever, M. 1980. Elevator Purchases Accelerates Weight Gain in Cane-control Study. Journal of Obesity 2:22-40.

- Too many large text blocks
- Text confused with background
- Randomly sized and colored boxes
- Annoying logos
- Cutesy and hard-to-read title

# Algorithmic Probes for Evaluating Computer Architectures

## FUTURE TECHNOLOGIES GROUP

Khaled Ibrahim [kzibrahim@lbl.gov](mailto:kzibrahim@lbl.gov) Shoaib Kamil [skamil@cs.berkeley.edu](mailto:skamil@cs.berkeley.edu)

### Behavioral Modeling Using Apex Map

#### Apex-Map: Memory Access Probe

Apex-Map generates memory references as stochastic variates based on sampling the following random process:

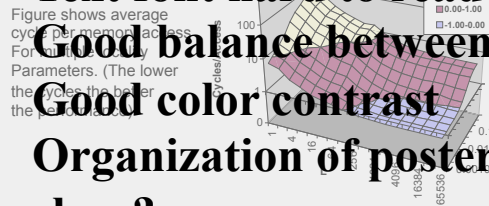
$$x_i = \frac{M}{L} r^\alpha$$

where  $\alpha$  represents the temporal locality parameter of an application,  $M$  represents the memory footprint of this application, and  $L$  represents the spatial locality parameter of the application.

#### Assessing the Performance of an Architecture

Performance curve studies the system interaction with multiple locality parameters.

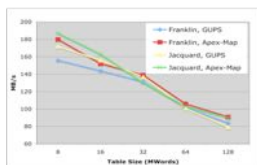
- Text font hard to read
- Good balance between text and graphics
- Good color contrast
- Organization of poster reflects organization of project, but is the reading order clear?



#### Using Apex Map as an Application Proxy

Other parameters are added to the model to capture complex application, such as computational intensity, register pressure, and concurrency level.

The figures below shows that Apex-Map can follow the behavior of CUPS application closely.

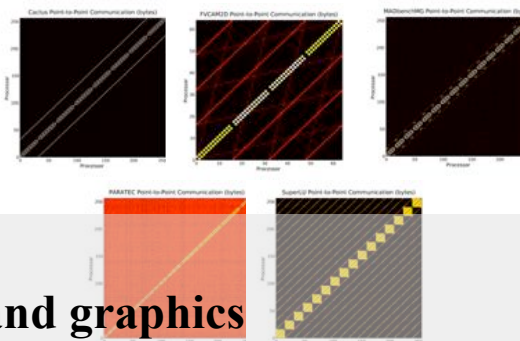


Apex-Map	Stream
Pattern	Random
Temp Locality	1
Spatial Locality	1
Reg. Pressure	1
Comp. Intensity	15
Concurrency	NUPTATE
Access Mode	NESTED

### Application Characterization

#### Application Communication Profiles

Characterize communication by using IPM profiling layer: run the full application unmodified and obtain the communication patterns. This shows the variety of communication signatures of DOE apps.



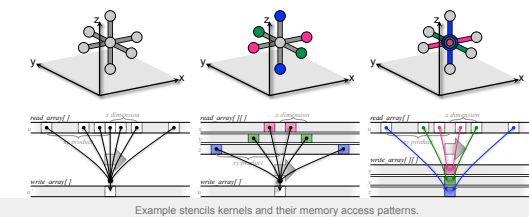
#### Extract Major Kernels

Based on communication and performance profiles, extract the major computational kernels into probes/reduced benchmarks, which can then

### Kernel Optimization

#### StencilProbe: Benchmark & Testbed for Stencil Optimizations

The StencilProbe enables optimization exploration of extracted stencil kernels, while avoiding the large overheads of running entire applications.



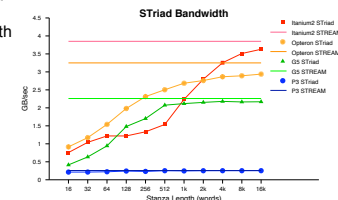
Using extracted kernels from Chombo and Cactus, two applications which heavily use stencils, data shows the StencilProbe accurately mimics application performance.



#### Discovering Prefetch Behavior using Stanza Triad

Based on the memory access pattern of cache-blocked stencils, the Stanza Triad is a simple version of the STREAM benchmark that uses stanzas: unit-stride triads are performed for a set number of locations before jumping in memory.

STriad results show that prefetching engines are sensitive to stanza length and memory bandwidth suffers if stanzas are (and thus stencil cache blocks) are too small.



**scaffold**  
microbial genome scaffolding software  
<http://next.gs>  
michael d barton<sup>\*</sup> hazel a barton  
northern kentucky university

**problems**

- { NEXT GEN SEQUENCING }**  
millions of reads  
hard to completely assemble
- { FRAGMENTED ASSEMBLIES }**  
repeat regions difficult to bridge  
uneven read coverage
- { REQUIRE FINISHING }**  
join contigs together  
trim noncoding sequences  
add PCR sequences
- { unreproducible }**  
manually editing a sequence  
can't be repeated by anyone else
- { hard to change }**  
large blocks of nucleotide sequence  
are hard to update and determine  
the source contig

**Workflow:**

1. Remove human error and scaffolds can be reliably reproduced from the same data
2. Separate sequences from the scaffold organization and preserve the original assembly data
3. Join sequences to edit the scaffold file compared with new nucleotide sequences
4. Visualize provides an overview of the genome construction and allows easier comparison of differences in scaffolds
5. (Unlabeled step in the workflow diagram)

**putative scaffold**

\*malamchaubarton@me.uk