

Giving Yourself Options with Interdisciplinary STEM

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Outline

- Interdisciplinary Examples
- Other Thoughts

Feel free to interrupt!

Part I: Interdisciplinary Examples

Takeaways from These Examples

- Some of the most exciting opportunities in STEM are for those that can work across traditional discipline boundaries
 - Either between different STEM categories (for example, biocomputation) or between STEM and other areas like business
- STEM can be applied to anything
- Everything is interdisciplinary
- Key is to get good fundamentals and stay flexible

Biocomputation

- Application of computer science to biological problems
- In reality, a vague term
 - It is used to describe everything from medical image processing to genetic sequence alignment algorithms
- The intersection of 2 massive revolutions

Revolutions

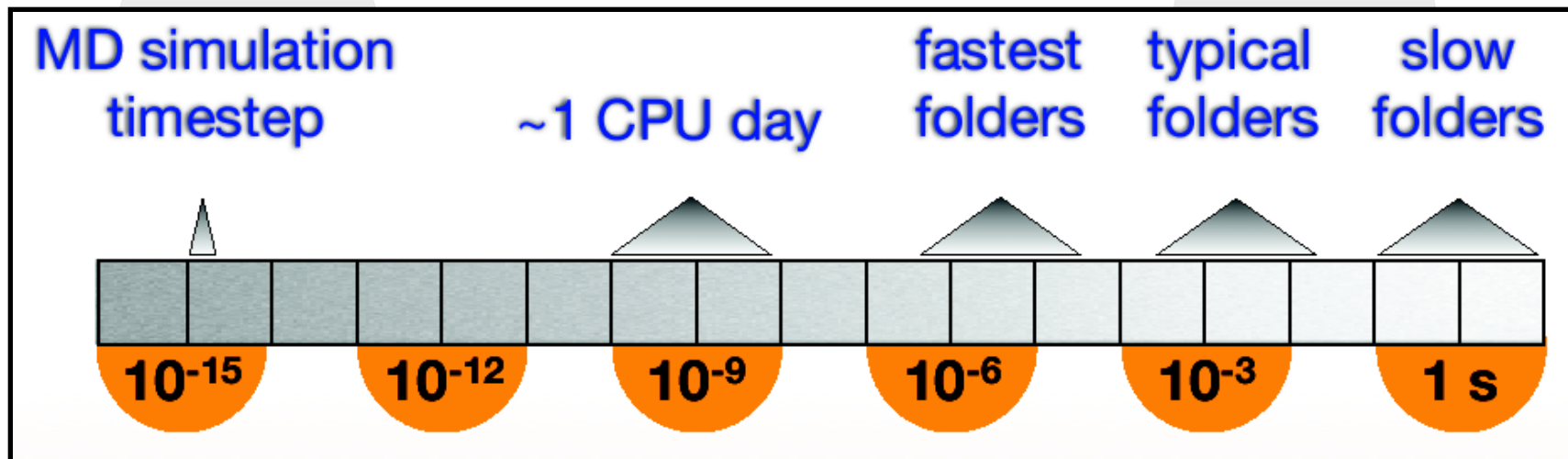
Computational



Biomedical

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Difficulties in Simulation



*If you could simulate 1 ns/day,
then a 1 ms simulation would take
3000 years!*

Difficulties in Simulation

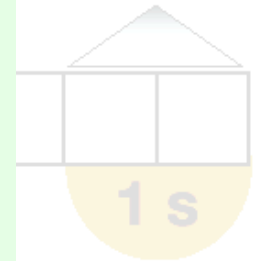
Need:

**More computational
power and better
computational
techniques**

MD simulation
timestep

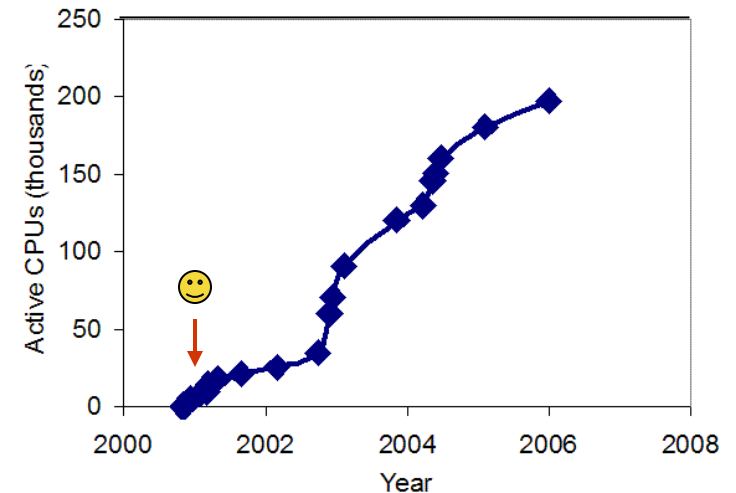
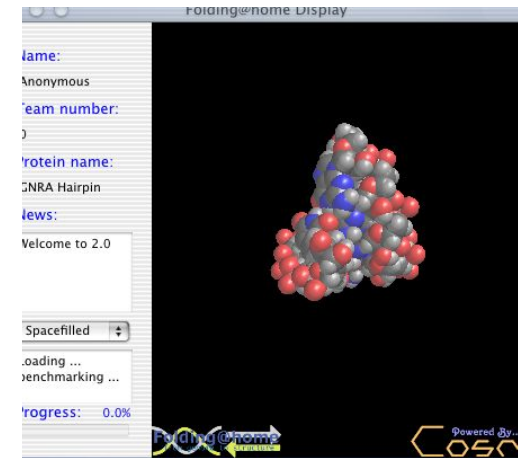


slow
folders



Folding@Home

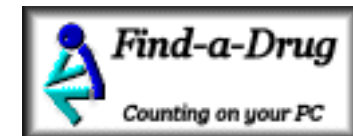
- Distributed computing project (<http://folding.stanford.edu>): anyone can run the software (Linux/Windows/Macintosh/PS3)
- Clients run assigned simulations with unused processor cycles
- Steady growth in install base
- Listed in Guinness Records for its power



Other Distributed Projects



climateprediction.net



MD@home



CycleTraders



a.me/



“there's a small, but
captivating possibility
that **your computer**
will detect the
faint footsteps of a
hairy monster...”



“The SIC project searches for just such
incredible coincidences. If we can find such a
coincidence, we can prove that the universe is
truly infinite!”

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Virtual Airplanes

Why compute? To make possible the otherwise impossible.

Where does that power come from? Using understanding instead of physical trial and error.



<http://guna.me/>

STEM + Non-STEM

- Understand business
 - Best learned by watching and doing
- Engineering principles can be applied to many areas
- Example of “social marketing:” Get On The Shelf

Get On The Shelf



Marissa Coughlin @marissac

smart move by @Walmart - 'Get on the Shelf' contest lets entrepreneurs and inventors compete for shelf space entm.ag/1b2phiy



Jason Lobel @jasonlobel

Cool competition for innovators to **get on the shelf** at @WalmartLabs #GetontheShelf #retail #3dprinting



Kimberly-Clark Corp. @KCCCorp

28 Aug

You wouldn't DIY w/o cleaning up, right? Help make Scott Rags in a Box available to all DIYers: bit.ly/14yAF5Q #GetOnTheShelf



David Muir @DavidMuir

17 Sep

got to see tomorrow night MT @sincerely_steve: @DavidMuir What if I can't decide who to vote for? All amazing inventions #MadeInAmerica



Lehigh University @LehighU

Vote for 2 @LehighAlumni finalists in the @Walmart "Get on the Shelf" competition: bit.ly/votekoolz



ChemoBeanies @chemobeanies

2

WE NEED YOUR SUPPORT TO GET CHEMO BEANIES ON THE SHELVES! PLEASE VOTE FOR US..... #GetOnTheShelf getontheshelf.walmart.com/product/1971/C...



Plum Moving Media @PlumMovingMedia

25 S

Interesting concept. Gonna have to check this one out.. | Walmart's Shark Tank Reality Series ow.ly/pcCqu #onlinevideo



Jeff O'Heir @jeffoheir

26 S

Good idea for CE retail. Wal-Mart Starts Reality Web Series to find new products ow.ly/pezS7 @dealerscope #avtweeps



Sean Sandhurst @SeanSandhurst

24 S

Great job @Walmart for this innovative, engaging #Video & #Social initiative! reelseo.com/walmart-online... #getontheshelf #smm



veena_srinath @veena_srinath

Why can't Indian retailers be more interesting? Wal-Mart Launches a 'Shark Tank'-Style Reality Web Series

Submission period

Many thousands of videos.

Screening

Watch every video.

Audition Round (with Public Voting)

Chooses 20 finalists. Film them!

Finals (Web Series): 5 webisodes

Release every Tuesday. Vote 72 hours.

Preorders Determine Champion: Finale

Complete CTL, etc.

Sales!

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“Just wanted to let you know how much I appreciated your contest. **It was great fun - and to top it off, my business has tripled since I entered...** Once again, thank you for all of the publicity (and the extra business)!”

“...I thank you, not just for me, but for **the opportunity you gave so many.**”

“Your professionalism from the beginning and throughout the first round has been **top notch** and it was a pleasure being included in the Mix. **I have gained numerous connections from being involved in the contest.**”

“Thank you the experience was a blast.”

“Thank you for the opportunity! It has been elating!”

“Thanks again for the exposure. We have received several orders and calls since we did the you-tube.”

“Thank you for the opportunity and for the encouragement, it's been a lot of fun!”

“Hats off to you, if you continue this policy, you will see that **America will always will remain first...**”

“We had article written on Fast Company magazine and were interviewed on TV by ‘The Morning Show’ in Jacksonville, Florida. **The ‘Get On The Shelf’ contest program helped us propel to even more exposure. Without it, we would not have been on the map.**”

“Thanks again for the opportunity. **This was a awesome contest.**”

“May God continue to bless Walmart and the Walmart family.”

“It was a great opportunity all the way around, and we look forward to maybe having the opportunity again down the road.”

“I wanted to thank you guys for the opportunity to be apart of this contest... **I’m just so appreciative that an opportunity like this came my way... ...Again you guys gave me so much fun for one short month.**”

“Opportunities like your Get On The Shelf promotion level the playing field and allow small business owners the opportunity to flourish! Thanks again for providing this exciting promotion. I am more determined than ever to grow my business because one day... will be in the position to offer similar opportunities to small businesses!”

“Thank you so much for allowing us to participate! We had a great time and made tons of connections! **We are well on our way** with a purchase of over 500,000... **Great exposure for us!** Thanks for the great time!”

These are some quotations from actual emails, from people who didn't win.

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Walmart!! YOU ROCK!! how impressive to get back to me with this response.

I do have to say that being in this contest has increased traffic on my website and I've received an increase in online orders! Amazing! Thank you for putting together such a great contest.

Thank you for having this contest! It definitely helps to get the word out about our product. Just want to let you know that we have interest in the UK for our product now, not just the US.

I wanted to take a moment to thank you so much for all you are doing for small businesses, entrepreneurs and inventors across America by allowing us to gain so much publicity thru your contest... This contest has been an amazing marketing experience... Our FB insights have increase over 1200%! We ran out of stock for all of our inventory here at my home office and have orders on hold to ship out when they come in this week! We have been contacted by a global distributor here in Tennessee, a distributor in Europe and we picked up another school Fundraising account thru our custom department! Wow, the exposure is amazing and [we're] so grateful!

I don't have a question. I have a comment. I think your "Get on the shelf" contest is outstanding. Whoever came up with the idea deserves an "atta boy". Why? Because we don't have enough companies in our country that appreciate new and innovative ideas anymore. That's why we're losing our competitive edge to other countries. The new ideas Wal-Mart is promoting is creating jobs for small business and America. Kudos to Wal-Mart !

I simply wanted to take this opportunity to thank you and tell you that your contest has made a huge difference in the growth of our product and we greatly appreciate the opportunity you have provided not only for us, but for all the well deserving products in the contest! You are making a difference!

Dear Walmart, I am really thrilled...! I have been getting some great press in my area of Philadelphia. I wanted to share with you a link to a great article featuring me, my product & the GOTS contest...

Just wanted to say thanks . The publicity from get on the shelf help us land 170 store chain.

Other Interdisciplinary Examples

- Medical image processing
 - Computer aided detection: Is there cancer in this mammogram or CT?
 - Management of images
- Biomechanical devices
- Finance
 - Examples: “Financial engineering,” high-frequency trading, venture capital
- Product design
 - Mechanical engineering plus art
- Computer animation
- Computational music
- Any early-stage technology startup
 - You have to wear many hats
- Many more...

Preparation

- Get fundamentals
 - Statistics and probability
 - Programming
 - Basic physics, chemistry, biology, in that order
- Get a variety of experiences
- If you have fundamentals and practice, you can apply skills in variety of ways and often learn enough of new application areas as needed