

## ABOUT US

**NGS Scholars' Alliance** is an official student group for **NUS Graduate School for Integrative Sciences and Engineering**.

Established in 2005 to serve as a platform for exchange amongst all **NGS** scholars. This student body will also facilitate the personal development and leadership training of our scholars. **NGSAA** is also the key to developing, creating and fostering **NGS** community and identity.

Webpage:

<http://ngsaa.weebly.com>

Email:

[ngs.alliance@gmail.com](mailto:ngs.alliance@gmail.com)

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## Issue Highlights

In this issue, we introduce the current NGS Scholars' Alliance and a short run-up of the NGS 2013 L.O.R symposium.

Also in this issue, we have a new section where we showcase research by fellow NGS scholars and hopefully, this can spark communication between fellow NGS scholars who are in the same field or share similar interest. This way, the newsletter can act as a bridge of communication between NGS scholars.

Last, the 1st M.E.A.T (Meet, Eat and Talk) session of 2013 saw several NGS scholars coming together for lunch, engaging in board games and making new friends. It also serves as a chance to meet people from the same field and just "talk". So do look forward to the next M.E.A.T session.

## NGS Scholars' Alliance Committee

Co-chair



Tan Zhen Wei (3rd Year)

"The life of a Ph.D. student is never easy, just check out Ph.D. comics if you don't believe me. So let's try to have a little fun while we work hard for the degree. I'm sure there are many fun NGS scholars (I personally know a few), so come contact me if you have any great ideas of fun with fellow NGS scholars or intellectual discussion on scientific topics.

P.S. I work in immunology.

Co-chair



Wallie Lim Wee Meng

"Wallie is currently in his 2nd year NGS student interested in involvement of chloride regulation in neuronal function. A strong believer in education and students cohesiveness, he hopes NGSSA would be able to achieve that. He is also an avid badminton fan and movie-goer"

Scholars' Development



Koe Chwee Tat

Chwee Tat, a 3rd year NGS student, is currently interested in understanding the epigenetic regulation underlying self-renewal of neural stem cell in *Drosophila*. In his spare time, he enjoys landscape and cityscape photography and badminton.

Social Welfare



Shawn Tan

"Shawn doesn't understand what he is doing half the time, but hopes one day he will. He works in Duke-NUS currently."



Sun Ye

"Hi, I'm Sun Ye from the NGSSA scholar's development team. My research area is nutritional epidemiology, and I love playing harmonica and table tennis in my free time. See you in the upcoming NGS events and also around NUS :)"



# NGS Scholars' Alliance Committee

## Social Welfare



**Michal Marcin Dykas**

"Here am I, Michał (pronounced like me-how), I'm Pole (or Polish) doing my PhD together with you. Shortly about my work? I do Bio-Inorganic Adaptive Interfaces. About myself, I think I am cheerful guy with lots of positive energy who likes to travel (maybe it was the reason I started study over here) and meet new, interesting people. Other hobbies? Photography, cycling and recently, squashing. In short that is me :)."

## Social Welfare



**Lim She Yah**

"I am a 1st year student working on the engineering of antibodies against dengue viruses. Besides being a science geek and desperately finding a therapy to save the dengue patients from the buzzing mosquitoes, I love photography and music! Photography allows me to capture the captivating moments of nature and live music like live band performances and musicals never fail to brighten up my day. Join me if these are what you are interested in too!"

## Communication



**Pornteera Pawjit**

"Pornteera is currently a year one student trying to solve the mysteries of a relatively unstudied protein called kinectin. After having moved around for a bit, Pornteera has decided that warm Singapore suits her quite nice."

## Communication - I.T.



**Chua Soon Hau**

"I work on research that relates to almost all human being who uses computer, phones, and other gizmos. While I'm not working, you can find me writing on the web, listening to music, and playing games! I write at [talksoon.org](http://talksoon.org)"

## Projects



**Zhou Yu Jing**

"Zhou Yu Jing, NGS Student from Chemistry Department"

## Projects



**Phang Swee King**

"I am Swee King, currently a 3rd year PhD student attached to Department of Electrical and Computer Engineering. My research interests lie in modeling and control of unmanned aerial vehicle (UAV), specifically focus on the development of the palm size UAV. Besides research, I do Taekwondo and play table tennis occasionally. Do visit my website [www.phangweeking.com](http://www.phangweeking.com) for more information!"

## Projects



**Tan Yan Zhi**

"Control and automation has been my area of interest since my undergraduate days in NUS. As a result, I am currently spending the majority of my time looking at how control performance in mechatronics can be improved by integrating mechanical design with controller design. In my pursuit of a balanced graduate life, I jog, cycle, chat with close friends about anything under the sun over good food, etc., which are all so typical of a city dweller. On the other hand, being part of the NGS Scholars' Alliance is certainly a unique addition to the list!"

## Projects



**Ng Chan Way**

"Ng Chan Way is born in Malaysia. He received Bachelor of Engineering (Bioengineering) in National University of Singapore (NUS). He is currently pursuing PhD in NGS, NUS under the supervision of Prof Henry Yu. His research focus is developing a robust device for cell isolation."

# Research Focus

This new initiative is to showcase some of the research work done by our fellow scholars hopes to create a communication bridge between fellow scholars from similar fields of studies. We encourage anyone with questions or comments about the research work showcased to write in and hopefully, the NGS newsletter can be another platform to share ideas. In this issue, we showcase the research of Zhen Wei Zhao, who is working on supporting non-linear and non-continuous media access in P2P media streaming systems.

## Support Non-linear and Non-continuous Media Access in P2P

### Media Streaming Systems - By Zhen Wei Zhao

#### Abstract

With the proliferation of interactive media, non-linear and non-continuous media accesses have become a norm. Examples of such interactive media include video-on-demand (VoD), networked virtual environment, massively multiplayer online game, zoomable video, Google Earth, and free-viewpoint video.

By non-linear media access, we mean different users access different parts of the media contents in different orders.

By non-continuous media access, we mean users access the media contents non-continuously (continuity is defined based on temporal, spatial, or logical locality). Both non-linear and non-continuous accesses are caused by user interactions such as seek in VoD, mobility and teleportation in networked virtual environment.

Peer-to-Peer (P2P) architecture is often adopted to deliver media contents to a large pool of users. The uncertainty nature of non-linear and

non-continuous accesses, however, poses new challenges on P2P interactive media streaming systems. The challenges include but not limit to:



### The challenges

#### Prefetching

The difficulty of prefetching lies in predicting users' intention, which has not been addressed well. In general, it is hard to devise a prefetch prediction algorithm that can match the performance of those in linear access. As a result, we should expect prefetch miss as a norm rather than exception.

#### Server Load

When coupled with an imperfect prefetch prediction algorithm, non-linear and non-continuous media accesses can potentially increase the server load. To understand their effect on the streaming system performance, we analytically studied how VCR operations such as seek and pause affect the server load in P2P VoD systems.

#### Fast Content Discovery

After non-continuous accesses such as seeks in VoD, content at the seek destination has to be located very fast to respond quickly to the user interaction. Existing content discovery approaches such as DHT often incur long lookup latency. We proposed an access pattern driven caching middleware named APRICOD. Instead of treating each media object as independent from each other, APRICOD exploits the correlations among media objects accessed by users. It can effectively resolve non-continuous access queries in a single hop with high probability.

#### Request Service Scheduling

Due to constant prefetch misses caused by non-linear accesses, re-

quests can be clearly classified into two categories: on-demand and prefetch. Request scheduling is performed by requesters to decide which object should be requested from which neighbor. Service scheduling is performed by responders to decide the serving order of incoming requests. Server load suffers if request and service scheduling is not performed properly. We proposed a unified scheduling scheme that not only co-designs request and service scheduling, but also works towards achieving the synergy effect between on-demand and prefetch requests.

Addressing the aforementioned challenges can help improve user experience during non-linear and non-continuous media accesses and meanwhile keep the system operating cost low. Nevertheless, non-linear and non-continuous media access is still a relatively not well researched area and it needs continuous research input.

Feel free to write in to us at [A0068121@nus.edu.sg](mailto:A0068121@nus.edu.sg) and we'll share your comments and ideas on the next issue. Do submit your research to us with a short abstract and 2 figures and we'll share with the NGS community in the next issue.

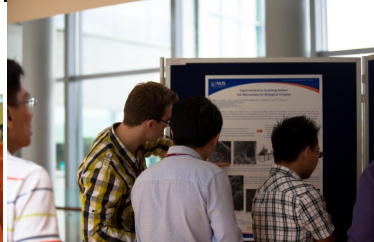
# NGS L.O.R Symposium 2013

On January 25, the NUS University Hall Auditorium was teeming with activity. The event was the 5th annual NGS symposium: NGS L.O.R. (Life, Opportunities, Research). The auditorium quickly filled up to hear Professor Michael Sheetz, director of MBI and a world-renowned scientist, deliver his keynote speech: "Following Nature's Challenge".



**Prof Michael Sheetz (extreme right) with symposium organizers**

There were 12 presentations made during the day showcasing the diversity of multidisciplinary research going on in NGS; while the topic being discussed was very complex, the presentations were simple and easy to understand akin to TED style high-impact talks. The presenters performed amazingly despite the constraint of having to present within 10 minutes. Between the presentation sessions and lunch/tea breaks, there were poster sessions. The posters were well received as well. Both presentation and posters were judged using a mixed system: audience voting and expert panel voting.



Continuing from last year's symposium, we also had a panel session. This year we had the pleasure of inviting Prof Shirish Shenolikar (Senior Associate Dean of Research from Duke-NUS), Dr. Chen Chang (Principal Member of Technical Staff, DSO National Laboratories) and Dr. Kiew Choon Meng (Research Engineer at the Singapore Institute of Manufacturing Technology, ASTAR and NGS Alumnus) for the panel discussion. We're very glad this session got good attention from the scholars this year as well.

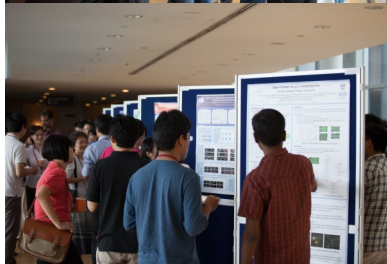


**Panel session from left: Dr. Kiew Choon Meng, Prof Shirish and Dr. Chen Chang**

We hope to increase the number of participants next year as well as continue the high quality of talks, presentations and panel discussions in the NGS symposium 2014.



**Left: Prof Philip Moore in his opening speech**  
**Bottom: Poster session with scholars and actively engaging in discussion**



**NGS Symposium 2013 organizing committee**

# M.E.A.T session 2013

