International Graduate Institute on Modeling Environmental Space – Time Processes

University of Washington, July 9 - 13, 2007

Overview:

The first session of the International Graduate Institute opened on July 9, 2007 and offered a course on modeling environmental space – time processes in accord with the course description on the PIMS web page found at: http://pims.math.ca/science/2007/07mestp/

The course had been advertised internationally and attracted quite a large number of inquiries. More than 30 eventually applied and 27 (the maximum feasible number) qualified participants were selected, those from PIMS institutions being given priority. Subsequently a number dropped out due to such things as fairly to obtain a US Visa. The final number in the Institute turned out to be 24. They are listed in a separate section below and reveal the Institute's international character.

Nhu Le, one of the instructors, was unable to be present so his lecture was given by Jim Zidek. Jim also gave the first lecture remotely from Vancouver using Skype technology to transmit both audio and video. That experiment was deemed to be quite successful by the participants, in spite of its low cost.

Yiping Dou and Zhong Liu served as Lab instructors, and in that role prepared and delivered lab lectures along with relevant software they had written. Participants regarded the labs as a highlight of the course.

Another highlight was the "case study" on the redesign of the Greater Vancouver Regional District's air quality monitoring network delivered by UBC's Douw Steyn. Douw's credentials added greatly to the credibility of the course.

Students were encouraged to register for credit and 3 did so in UW Stat 593 while 2 did so in UBCV Stat 547. Their project reports are due at the end of July.

Overall, participant reaction was very positive. All or almost all participants attended each of the labs and lectures throughout the week. Written comments and constructive suggestions were invited and the responses are included below.

Lecture, lab notes and software:

Lectures and housekeeping details:
http://www.nrcse.washington.edu/events/school/index.html

Lab lectures and software:
http:enviro.stat.ubc.ca

Participants:

Dalhousie U
Wade Blanchard <wade@mathstat.dal.ca>

Emory U
David Wheeler <dcwheel@sph.emory.edu>

Simon Fraser U
Simon Bonner <sbonner@stat.sfu.ca>
Elizabeth Juarez ejuarezc@sfu.ca
Aaron Springford <aspringf@sfu.ca>

U Calgary
Dave Keith <dmkeith@ucalgary.ca>
Chao Qui <cqiu@ucalgary.ca>

U British Columbia Okanagan
Zuzana Hrdlickova <hrdlickova.z@fme.vutbr.cz>

U British Columbia Vancouver
Shuyu Fan <s.fan@stat.ubc.ca>
Stoitchko Kalenderski <SKalenderski@eos.ubc.ca>
Bela Nagy <nagy@stat.ubc.ca>
Liangliang Wang, Ms <liangliang.wang@mail.mcgill.ca>
Wei Wang <wwang@stat.ubc.ca>
Samuel Wong <swkwong@gmail.com>

U Washington
Veronica J Berrocal <vjb2@u.washington.edu>
Catherine Holt <caholt@u.washington.edu>
David, Hsu dhsu2@u.washington.edu
Frederic Lott <lottf@u.washington.edu>
Sun-Young Kim <puha0@u.washington.edu>
J. McLean Sloughter <seamusmclean@gmail.com>
Tanja Srebotnjak <Tanja.Srebotnjak@Yale.edu>

Abroad:
Samuel Albani <samuel.albani@unimib.it>
Thordis Linda Thorarinsdottir <thordislinda@gmail.com>
Erin Peterson pet221@csiro.au

Participant assessments and suggestions.

Date: Fri, 20 Jul 2007 11:08:58 +0200
From: Samuel Albani <samuel.albani@unimib.it>

Here are my comments on the institute.
Let's start with the contour: since I came from far away the travel costs were indeed high, so I took a huge advantage by the funding that provided accommodation and the 100 $ conference card; without that it may not have been possible for people coming from far away to join the IGI.

Regarding the course itself I found that the presence of people from different places and with different backgrounds was stimulating both personally and as a chance to understand the possible applications of the techniques shown. As a non-statistician I appreciated the application orientation of the IGI and the possibility to have both lectures and explained software applications, thus allowing everyone to take the time one needs to study and understand the presented tools. Although I am just at the beginning of my statistical-related work and I still have to clarify what tools I actually need, so that my feedback will come further in time, I appreciated very much the school and found it useful for my near future. I hope there will be the chance of further courses like this.

Best regards,
Samuel

Date: Wed, 18 Jul 2007 20:49:38 -0700
From: Simon Bonner <sbonner@stat.sfu.ca>

First off, I want to say how much I enjoyed the course last week. It was great to be able to learn about these methods from you, Peter, Paul, and Douw who obviously have so much experience and expertise in the area of space-time modelling. The lectures were often intense, but I found that I got a lot out of them with a couple hours reviewing in the evening.

My one comment is that I found the labs were often difficult to follow. The main reason for this is that I was still struggling to understand the material that had been presented only that morning -- or was to be presented the following

morning. I was able to run the different bits of code in R to produce output, but as a statistics student I was more worried about what was really going on with the models. I think that for me it would have been better to have more time to get to grips with the statistics, and worry less about the actual computing.

I know that there was a large mix of students in the class – from theoretical statisticians to applied biologists and environmental scientists -- and I'm wondering if it might have been possible to split the group in the afternoons. I was thinking that the same lectures could be used in the morning to provide a general overview of the methods to all of the students. The class could then split in the afternoon so that the applied students could get hands on with the computing, and the theoretical students could get deeper into the math.

Thanks to Julie for organizing accommodation in the residence halls, food arrangements, and the opening mixer. Everything worked very well and it was a very comfortable week.

Thanks again to you, Peter, Paul, and Douw.

Cheers, Simon

Date: Wed, 18 Jul 2007 12:03:13 -0700
From: "Hrdlickova, Zuzana" <Zuzana.Hrdlickova@ubc.ca>

Thank you and other organizers for preparing such a great week for us. I have enjoyed the International Graduate Institute very much and I have learned a lot in particular.

I very much appreciated the possibility to download your presentations and supporting sources as papers, since I could study the topics during evenings. This was very helpful.

Because I haven’t used R previously, I was not very fast in the labs. But I can return to the carefully prepared files later.

Your first talk from cyber space was impressive and I understand that itwas necessary, but I still enjoy talks with living teacher much more.

The load of interesting information was huge, so my brain refused toaccept more at the end of the week. However all the techniques were new for me and I can not expect to understand everything on the first sight.

Thank you for that great week

Zuzana

Date: Fri, 20 Jul 2007 15:54:19 -0700
From: ejuarezc@sfu.ca

It was a nice experience to participate in the workshop, besides learning a lot of things, I also made friends which is always great!

My comments and suggestions are basically in terms of the organization of the lab. The lectures were excellent, but the lab was sometimes not exactly in accordance with the morning's lecture. So maybe it would be helpful to plan next time together the lecturer and the lab TA. But I insist in that the workshop was wonderful and I got lots of things out of it.

Regards, Elizabeth

Date: Sat, 14 Jul 2007 22:22:42 -0700
From: Stoitchko Kalenderski <skalenderski@eos.ubc.ca>

The course was very useful for me in a sense I have opportunity to see the same problems from a different prospective. The labs gave us practical experience on relatively wide range of important problems and I think I will use this software somehow in my future work.

Date: Thu, 19 Jul 2007 12:02:15 -0600
From: Dave Keith <dmkeith@ucalgary.ca>

Now to my course comments...

1: There is a lot of information in here, which is great. It really would have been nice to have the slides either printed off for us so we could have taken notes on them (I know the cost is an issue) or have them ready and posted before the course started so we could have printed them off before leaving for Seattle.

2: The lab's were an excellent idea, I really appreciate getting all the R code. I thought that the instruction in the lab's could have been better, there were a number of times that people asked "what are we doing" or similar questions, I certainly had trouble understanding what the point was on a number of occasions. Not sure I have a good suggestion for this as the T/A's were certainly prepared, in some cases I know they went over the "theory" rather quickly. It also would have been nice to have a bit better tie in between the lectures and the labs, it was difficult at the time to put the two together, although as I go over the notes I am starting to pull it all together.

3: I really liked the lectures that gave overviews of different methods or pointed us to additional resources, as we certainly can't cover everything in one week. The lectures I didn't care for were the very detailed mathematical exposes on a given topic (Lecture 3 for example) that really didn't give us a context in which to place the topic. It's always nice to have these lectures set up as Introduction to a problem, how to solve the problem, description of the method used, results of using method, and a wrap of methods strengths and weaknesses along with references and suggested further reading.

4: The case study by Douw was very interesting. It was a nice example of a problem, a couple of us were thinking it might have been nice to have it at the start of the week, as an example we could think about in the context of the material we learned subsequently.

5: The student presentations were a very good idea, but I didn't think the execution was all that great. Partially I think that was due to the students not knowing exactly what to expect until we arrived. In my case I threw some data together quiet quickly, whereas it would have been nice to sit down with my supervisor before hand and discuss how to approach presenting my problem, and what data might be best to discuss. Rather then me showing you all my problems I probably should have focused on one topic that you guys could relate to. They also may have been nice at the start of the week for everyone to think about as they learned these methods.

Well that was certainly long winded so I'll leave it at that for now, I likely don't fully realize how hard setting up this course must have been, but I certainly appreciate it. It has to be hard to get the right balance of detail with such a wide-ranging student base. I feel much more comfortable reading and discussing these topics now, and I hope I can find a way to use the Bayesian framework within my modeling. Thanks again for taking the time to set this up
Cheers, Dave Keith

Date: Sun, 15 Jul 2007 16:17:34 -0700 (PDT)
From: Bela Nagy <nagy@stat.ubc.ca>

Thank you so much for the opportunity to attend the summer school!

For me it's been an unforgettable experience. I was especially impressed by the amount of work that Yiping and Zhong put into the labs to make it useful and make the code immediately usable.

Personally, for myself I found it very fruitful because it's given me several new research directions that I intend to follow up on.

Date: Thu, 19 Jul 2007 07:30:02 +1000
From: Erin.Peterson@csiro.au

I enjoyed the lectures from all three instructors because they started out with the basics and then led into more detail as the days went on. I thought they were appropriate for the multi-disciplinary audience since they provided statistical details, as well as, the big picture. The real-world environmental examples were especially interesting and helped me to better understand the models.

Overall, I enjoyed the labs, but some went more smoothly than others. I thought both lab instructors seemed knowledgeable about their subjects and had a lot of enthusiasm. They were both good lecturers, although Zhong really needed to slow down on the first day. I really appreciated being given the R code so that I could play with it when I got home. Without it, I don't think that I could implement some of the models that we talked about. The third lab 3 given by Yiping was unfortunately a bit of a disaster. It was unclear what we were supposed to do for the group exercise, we were given data but we didn't know what it represented, and we were given the wrong location data. To avoid this type of mishap, I think it's important to include metadata with the data and to have someone else go through the example before the lab to make sure it goes the way you planned. Of course, sometimes these things happen no matter how careful you try to be. I would also suggest that the main instructors stay for the duration of the lab so that students can ask them questions and so they're available in case of a mishap.

Erin

Date: Sun, 15 Jul 2007 23:41:54 -0600 (MDT)
From: cqiu@ucalgary.ca

Excellent research experience during a week
The past week in the University of Washington is very impressive. There is much more that what I can say here, both in academic improvement and network. The program is suited for different levels of graduate students and researchers who have interest in the space time analysis and its application in environmental research. Since the program covered very wide range of knowledge of space time analysis, the learning process was really compressed. Surprisingly I still had access to very specific practice using complex computer programs as a beginner. During the week, most of us not only got excellent instructions and references for the topic, but also came up with lots of ideas about the future research interest. All of these attribute to the excellent organization of the professors and tutors who have intensive practice and rich research and teaching experience. All professors are famous and dedicated to this area. I could always find valuable comments for many specific points. From the communication with professor, other graduate students or post-doctors, I also have more ideas about the recent research interest in the related areas and other interesting topics in statistics. Many of us also have built up a networkfor this topic.

Due to the time limit, the program was first designed for the practice purpose. However all attendants are research orientated, which is suitable for the content of the program. I think we can promote the research activities by allocating more specific time for each group of students with different background and a professor or a tutor to digest part of the topics and come up with some research interest and ideas. Even though it will be very brief and has not much calculation, but this is possible to generate and refine some initial ideas for us graduate

students with research experience if we have accessed to the related reference under thesupervision of a professor at the beginning of the program.

Thanks a lot for your attention!

Chao Qiu
U of Calgary

Date: Sat, 14 Jul 2007 14:47:55 -0700
From: J McLean Sloughter <seamusmclean@gmail.com>
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Overall, I quite enjoyed the course. The one thing that I would suggest could be added would be, some time before the course, to post or send out some information on suggested background material. For example, in the first lab, the first step of our suggested problem was "Perform a time series analysis and choose an appropriate method to remove any temporal trends." Not having done much of any time series work before, I did not know how to go about doing this, which left me unable to do the rest of the exercise. If I had known beforehand, I could have read up on some basic time series analysis, and would have been in a better position to get more out of that lab.

We seemed to have quite a variety of backgrounds coming into this course, and probably many others would have been familiar with time series work, but unfamiliar with some other aspects assumed for the course (I know at least one other student was having to teach himself R for the first time in lab) - giving a list of what sorts of common background we should all have for the course would allow us to make sure we're all on the same page when things start.

One of the best aspects of the course was the chance to meet people from other institutions and departments. I feel it helped bring our programs closer together, and also provided a nice diversity of experiences - talking to others in the class about their research was extremely interesting.

Thank you for your part in organizing all this. I'm quite glad I had the chance to participate.

-McLean

Tanja Srebotnjak

Comments on First PIMS IGI on Environmental Space-Time Modelling
University of Washington, Seattle
9-13 July 2007
Tanja Srebotnjak

First and foremost I wish to thank the organizers for developing and conducting this workshop. It was very well organized, highly educational, and rich in opportunities for academic and social exchange! I also want to thank PIMS, NRCSE, and NSF for providing funding for the event.

Here is what I particularly liked and found useful during the IGI:

1. The combination of lectures and labs. The labs helped to translate the theory presented in the lectures into practice, helped identify what software is available to model environmental space-time processes, and helped to commit the methods to memory.

2. The quality of the lectures. It was evident that all speakers had put a substantial amount of work and effort into their lectures, which were clear and very well presented. I found it remarkable that a 1-week course could provide both the theoretical depth as well as the range of topics in as integrated a fashion as IGI did.

3. I liked Jim's idea to include study and research questions. They provide food for thought and conversation at the workshop and at home.

4. The length of the IGI. I think that 1 week was just about perfect for a graduate institute. More than that and people start worrying about work (they probably do regardless) but less than that and the course gets to heavily packed with material or is not comprehensive enough.

5. The accessibility of both lecturers and lab instructors during and after lectures/labs. This helped enormously to clarify immediately, any questions or related issues.

6. The size of the workshop. I felt that 20-25 participants were about the right size for the IGI. More would have made it more difficult to conduct labs. Fewer would have probably limited the range of backgrounds and applications for space-time processes that people brought to the workshop.

7. The effort the organizers and lab instructors committed and the enthusiasm of the participants. The success of the IGI was in no small part

due to the commitment and enthusiasm of the organizers and participants. Watching Jim lecture from his office at UBC via Skype did not only work without a glitch but was actually an enjoyable experience. The IGI also showed itself to be robust against extreme temperatures.

8. The student presentations. This was a wonderful idea to make the IGI even more interactive and relevant to the participants' own research.

Here are some suggestions for future IGI's:

9. Jim's opening lecture provided an excellent foundation for the course. Yet, I still felt overwhelmed at first by Peter's follow-up lecture on spatial processes. I am also aware that the course brought together students with a wide range of experience in modeling space-time processes and that I was on the extremely low experience end of this spectrum (the only course I have ever taken that could be seen as relevant is stochastic processes some 10 yrs ago – and I did not enjoy it much! I also did not have the time to read the Le & Zidek book in advance.). So it is very difficult to design a lecture that is attractive to everybody. I wished though that the first 15-20min of Peter's lecture had developed the general spatial process model a bit more gradually rather than plunging right into the theory. At the same time I also want to say that the clarity of all lectures soon provided me with sufficient "aha moments" to understand in retrospect the nature of a spatial process and the need for concepts such as isotropy.

10. I really appreciate the efforts of the lab instructors. Their programs and explanations were invaluable to my understanding of the course material. The one thing that nevertheless diminished the impact of the labs to the extent that I feel I want to list it here is the issue English proficiency. Being a non-native speaker myself I feel uncomfortable making this an issue because the academic qualifications and efforts of the both instructors were flawless and making language an issue could be construed as discriminatory. But perhaps because I am a non-native speaker I can actually speak about how it required double the concentration at times to follow the instructors' explanations and advice. I do not have a good suggestion for improvements other than perhaps preparing more handouts for the labs that can be consulted during and after the labs.

11. This is more a thought than a criticism or suggestion: Since I hope that the IGI will become a regular event and highlight for graduate students and post-docs and as experience in organizing it grows over time, it might be possible or useful to categorize the institutes according to "introductory", "intermediate", and "advanced" or some other scale. I would completely understand it if the organizers do not want to restrict the IGI's in such a

way. My point is that it would probably create a somewhat more homogeneous body of participants, not with respect to their fields of research and application but in regard to their background experience in the IGI topic, which would then facilitate more detailed lectures, i.e., more introductory concepts or advanced theory. This thought is tied to my comment 7. above.

12. Please continue to make the lectures and labs available online for download – the sooner the better. This is the most efficient way to review the material and to refresh one's memory when using some of the methods provided in the future. It also ensures that one can concentrate on the speaker during the lectures rather than on taking notes.

13. Lastly, after Jim's successful Skype lecture, I am wondering if future IGI's could not be video-streamed online to reach more people? It would help reduce IGI costs as those people would not need to travel to the workshop site and also reduce GHG emissions.

Date: Wed, 18 Jul 2007 19:57:31 -0400
From: "Liangliang Wang, Ms" <liangliang.wang@mail.mcgill.ca>

In my opinion, this summer school was well prepared and organized very successfully. First, it provided an opportunity for those working on spatial statistics to learn more and discuss their research topics with their colleagues. Second, valuable lectures are given for those who didn't know much about spatial statistics. As for me, I am willing to learn more on spatial statistics after this summer school. Because I am a new PhD student, it is helpful for me to know research topics as many as possible before I decide the topic of my PhD thesis.

I have an idea for the future organizer: At the first day of the summer school, students are divided into several groups, and each group is assigned a small project and an instructor. During the summer school, students will use the knowledge and software learned in the lectures to complete those projects. On the last day of the summer school, each group gives a presentation based on its project. In this way, all the students will be involved in solving problems with their friends, which is more interesting than just listening to others.

Best wishes, Liangliang

Date: Sat, 14 Jul 2007 17:43:52 -0700 (PDT)
From: Wei Wang <wwang@stat.ubc.ca>

Just want to appreciate this great opportunity for me. I learned a lot in this area! The week is really enjoyable.

One tiny thing for me such a new beginner, I may need more time than others to digest
the R packages and functions to follow the labs. Again,thanks for organizing this summer workshop.

Date: Wed, 18 Jul 2007 16:17:31 -0400
From: David Wheeler <dcwheel@sph.emory.edu>

I enjoyed meeting and spending time with the international group last week and it was good to learn what people are working on.

For future IGI workshops I would recommend you have the course notes printed Out for students. It was not ideal to have to wait until returning home to get the notes. Also, I would suggest giving students copies of the textbook or recommend that they get access to the book in advance of the course and read the relevant chapters. I would have gotten more from some of the lectures if I had done more
reading first. It was disappointing that Nhu was not present, as I was looking forward to hearing his perspective on linking cancer and environment hazards, but I understand that scheduling conflicts can arise.

Regards, David