



IRIS International Development Seismology (IDS)

'Advanced Studies Institute on Seismological Research'

Kuwait City, Kuwait

January 19–22, 2013



This ASI is designed to engage scientists in advanced techniques in receiver functions and imaging earth structure

Advanced Studies Institute Earthquake Location: Sustainable Networks, Receiver Functions, and Earth Structure

objectives

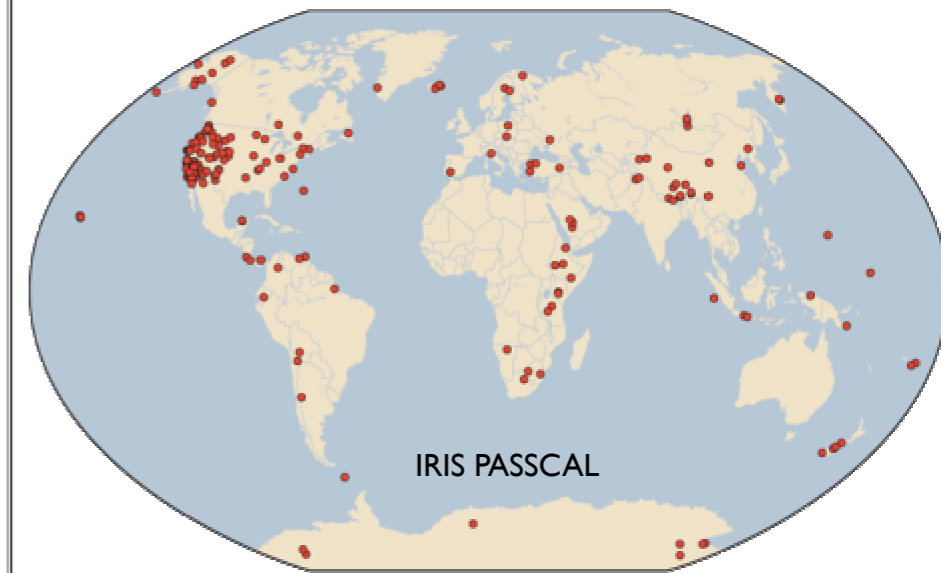
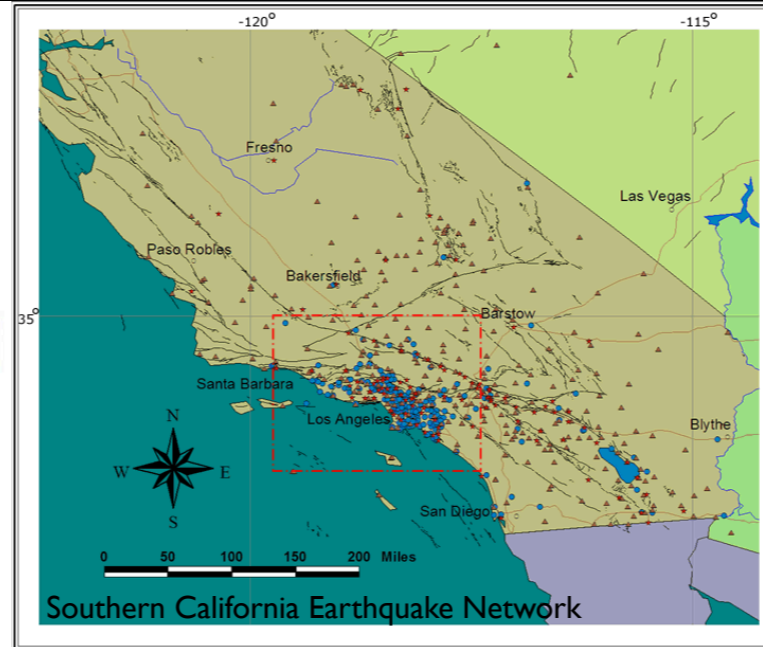
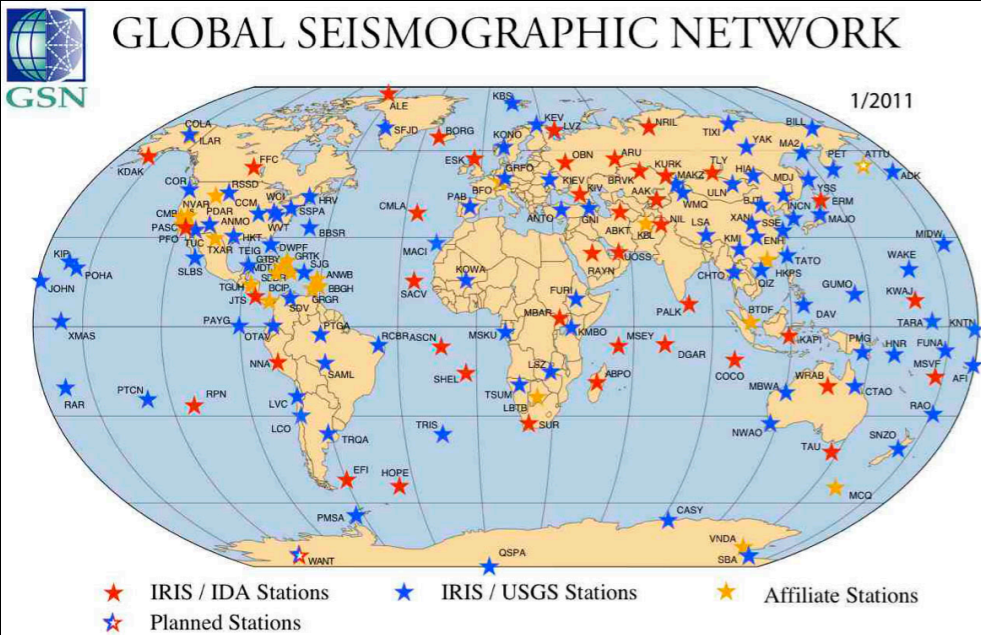
- promote open access and data exchange within and between countries in support of research, education, and hazard mitigation
- examine recent advances and current challenges in determining earth structure from receiver functions
- facilitate future research collaborations

Who am I?

- Professor at the Dept. of Geological Sciences at the University of Missouri
- Earthquake Seismologist-
Specialize in Earth Structure and large broadband deployments
- I have worked primarily in Asia and a bit in South and North America
- Member of the IRIS-IDSC committee – making IRIS more international



the importance of local and regional networks



←→
continuum

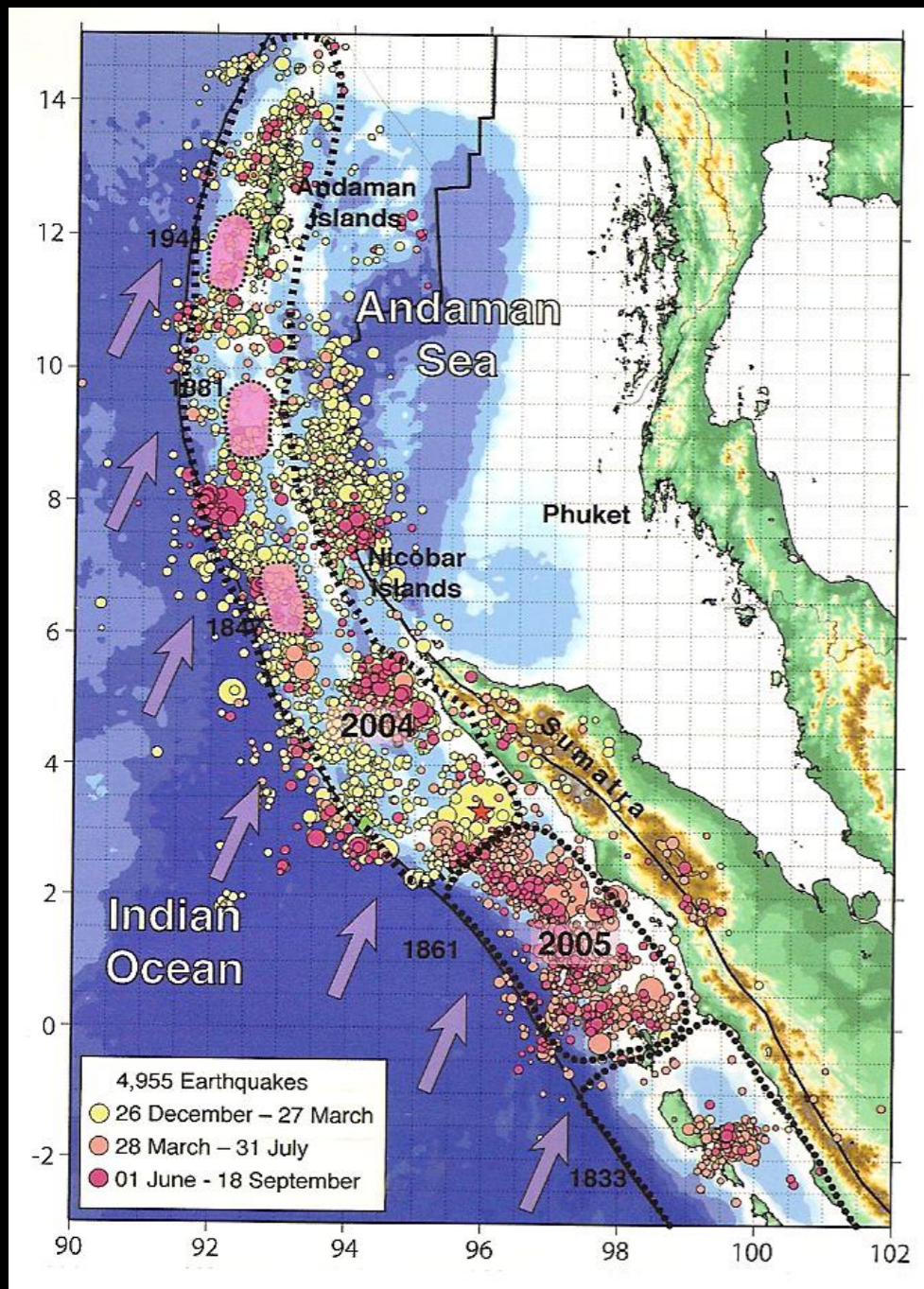
- permanent observations
- high resolution
- local/regional interests and priorities
- earthquake physics, earth structure, deformation
- hazard mitigation and risk reduction
- education

The importance of local and regional networks

Largest Earthquakes					Deadliest Earthquakes				
Year	Date	Magnitude	Fatalities	Region	Year	Date	Magnitude	Fatalities	Region
2011	03/11	9.0	20896	Near the East Coast of Honshu, Japan	2011	03/11	9.0	20896	Near the East Coast of Honshu, Japan
2010	02/27	8.8	507	Offshore Maule, Chile	2010	01/12	7.0	316000	Haiti
2009	09/29	8.1	192	Samoa Islands region	2009	09/30	7.5	1117	Southern Sumatra, Indonesia
2008	05/12	7.9	87587	Eastern Sichuan, China	2008	05/12	7.9	87587	Eastern Sichuan, China
2007	09/12	8.5	25	Southern Sumatera, Indonesia	2007	08/15	8.0	514	Near the Coast of Central Peru
2006	11/15	8.3	0	Kuril Islands	2006	05/26	6.3	5749	Java, Indonesia
2005	03/28	8.6	1313	Northern Sumatra, Indonesia	2005	10/08	7.6	80361	Pakistan
2004	12/26	9.1	227898	Off West Coast of Northern Sumatra	2004	12/26	9.1	227898	Off West Coast of Northern Sumatra

The importance of local and regional networks

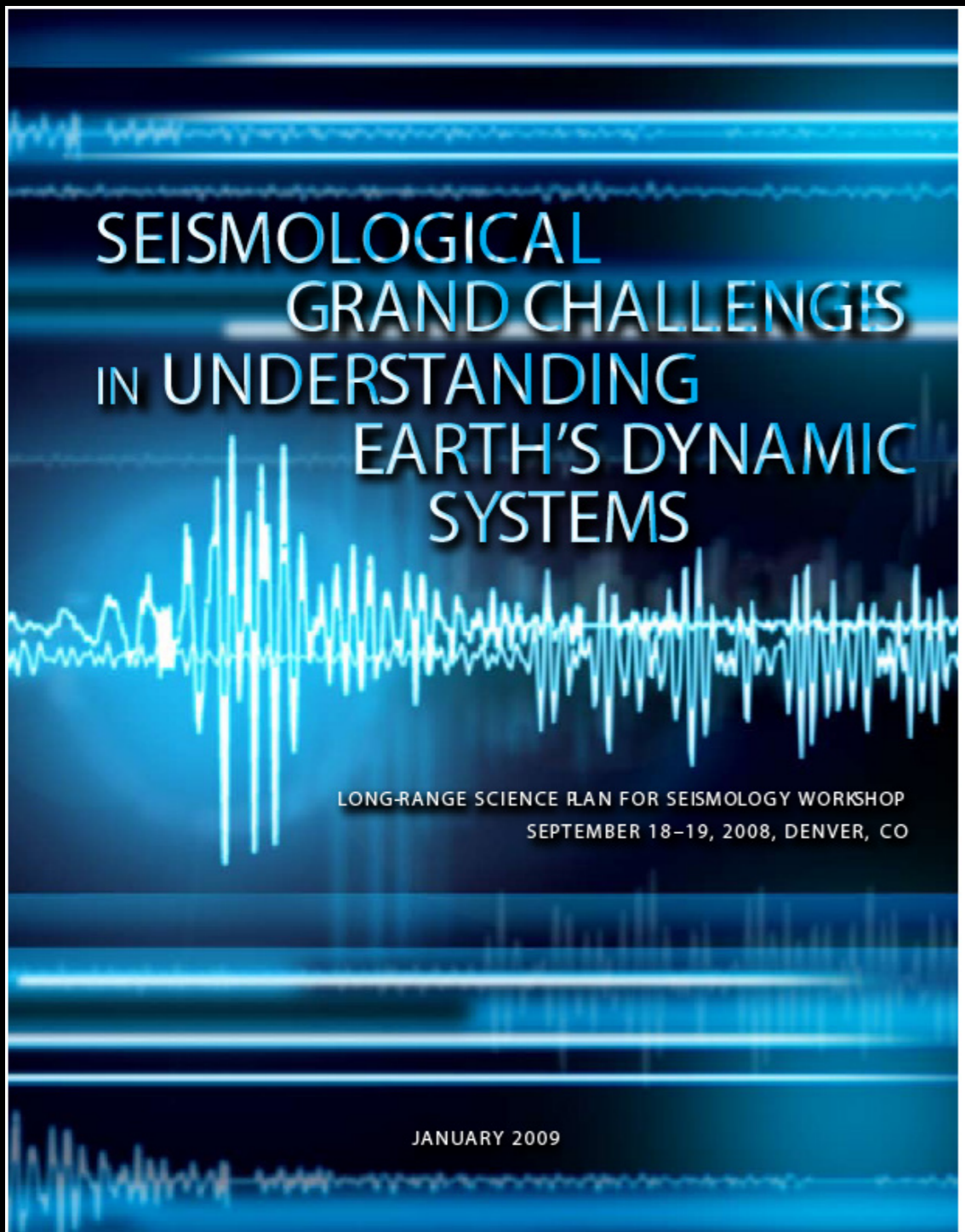
- earthquake physics, earth structure, deformation
- hazard mitigation and risk reduction
- Education
- permanent observations
- high resolution
- Local/regional interests and priorities



sustainable networks challenges and opportunities

- **sus-tain-a-ble** /sə^lstānəbəl/ adjective
- able to be maintained at a certain rate or level
sus-tain-a-bil-i-ty /sə^lstānəbilite/ noun

and the critical element to make that happen is
human capacity



- how do faults slip?
- what is the relationship between stress and strain in the lithosphere?
- how do plate boundary systems evolve?
- how do magmas ascend and erupt?
- how does the near-surface environment affect natural hazards and resources?
- how do processes in the ocean and atmosphere interact with the solid earth?
- where are water and hydrocarbons hidden beneath the surface?
- what is the lithosphere-asthenosphere boundary?

- what is the lithosphere-asthenosphere boundary?
- how do temperature and composition variations control mantle and core convection?
- how are earth's internal boundaries affected by dynamics?

Advanced Studies Institute on Earthquake Location:

Date	Day	Topic
19-Jan.	1	Introduction to ASI/Introductory Lectures to Receiver Functions
20-Jan.	2	Receiver Function Inversion (jntsmth)

Advanced Studies Institute on Earthquake Location:

Date	Day	Topic
21-Jan.	3	Surface Wave-Receiver Function Joint Inversion
22-Jan.	4	Research symposium Future research roundtable

Technical Considerations

- We will primarily use VirtualBox, (please make sure the latest version is installed on your lap top)
- We have provided a “VDI” file that you can use with Virtual Box to start a pre-set Ubuntu 10.10 64/32 bit operating system
- You should find a username called asi participant with the password “asi123asi”

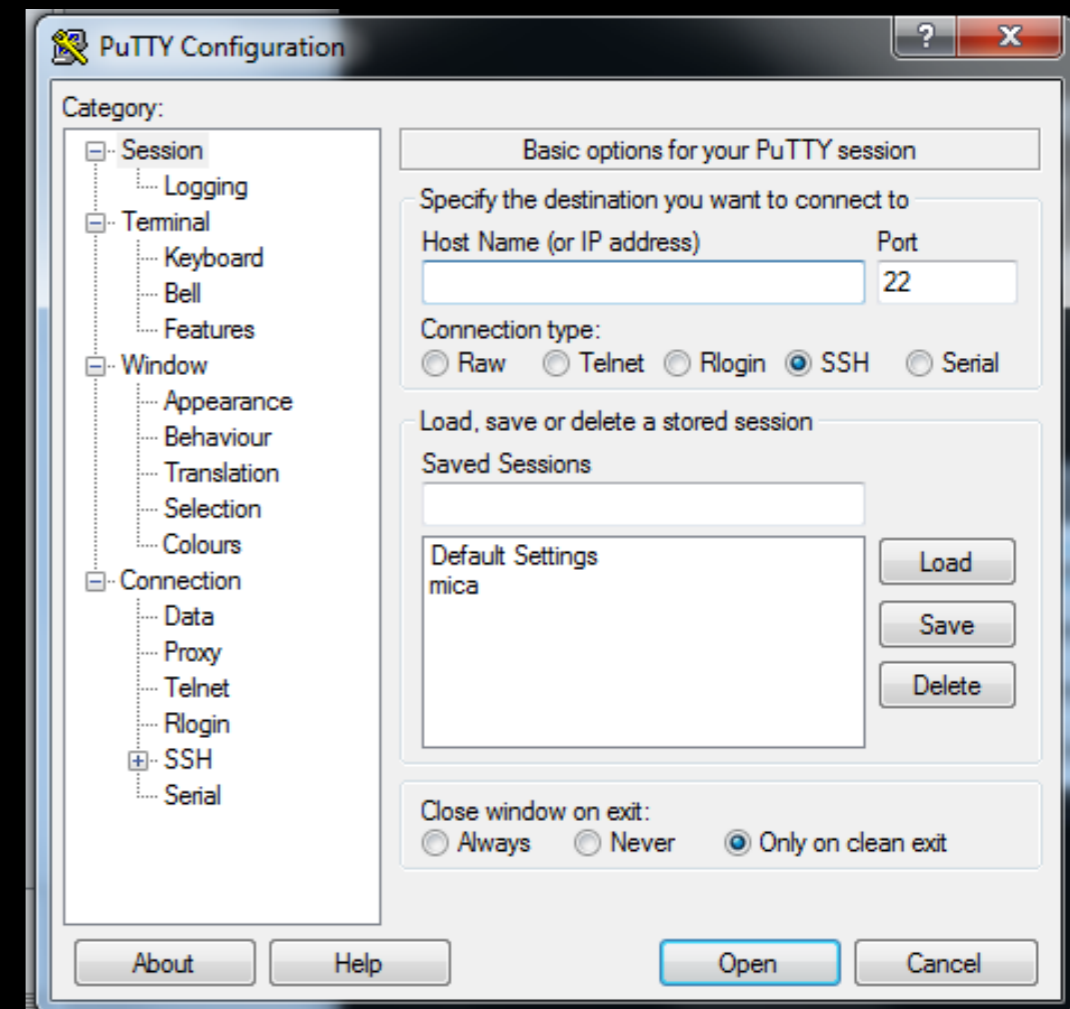
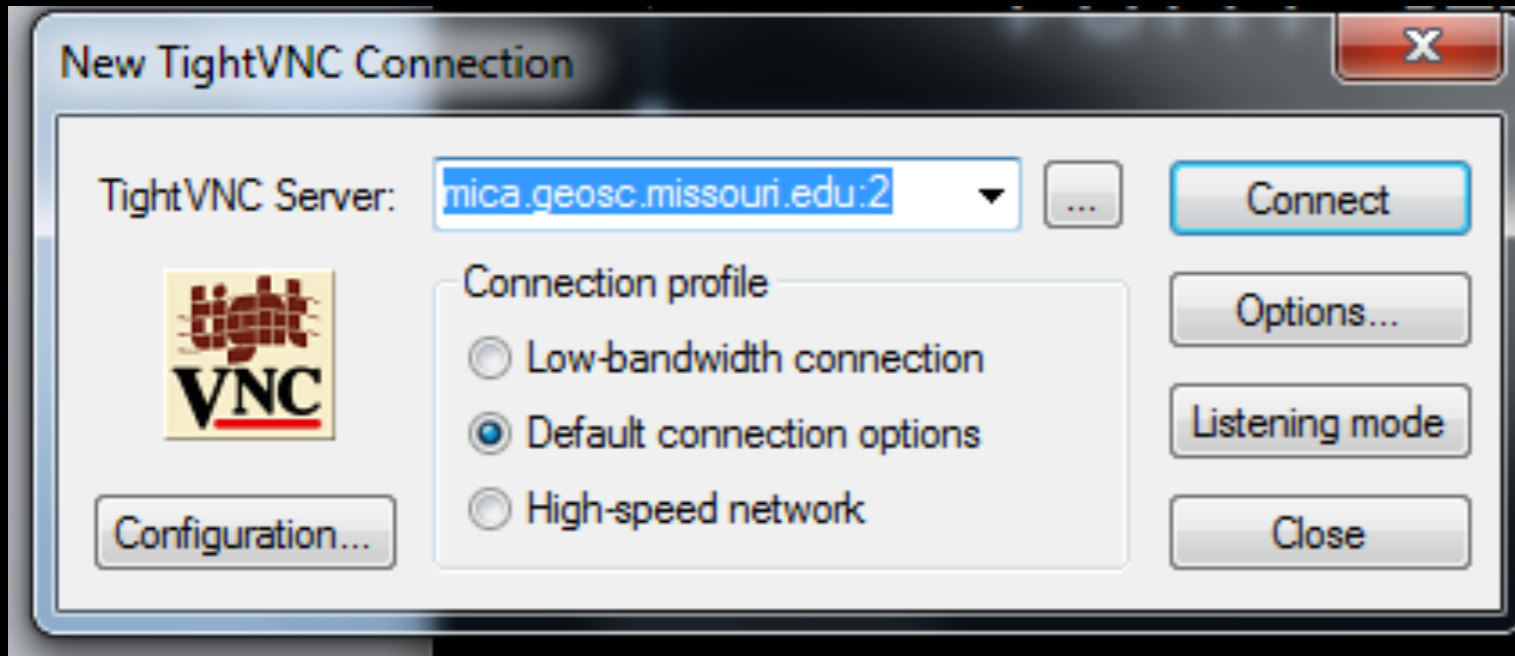
Technical Considerations cont.

- Once you have logged in you need to find the ASI_Software Directory
- In that directory we have two directories: /home/hrvoje and /home/jordi
- These codes should not need to be recompiled and should work unless you have set your Virtual Machine with less than 1 Gbyte of RAM memory. If you get the dreaded “Killed” error this is might be what is wrong

What if VirtualBox or the VDI does not work ...

- We have six computers generously provided by the KISR and IRIS . If necessary you can use one of these machines and VirtualBox installed on it
- What if this does not work ...

We also should have the ability to logon onto PASI-PC remotely using VNCviewer and PUTTY, see me and I can help



You can also access PASI-PC (our Testbed computer)

- For Windows: Install PUTTY and VNCViewer from the Windows Install Folder
- For Linux use SSH and VNCViewer
- Login into PASI-PC using SSH/PUTTY and start vncserver:
- Example:>vncserver :2 (this last number MUST be unique so we must coordinate)
- Launch VNCViewer and enter the PASI-PC IP Address (tentatively 192.168.71.134:2 where that last number is the same as you used with vncserver)

ASI Intranet

- Name is ASI-NET
- Password for access is asi123ASI
- We have also placed a disk that you can map to your desktop or access through Places->Network-ASI-NET->Public, Username: guest, Password: asi123asi
- Because the Internet is slow you will need to be patient. We can also distribute the files if necessary by memory stick

Exchanging Files Between the Guest and Host using VirtualBox

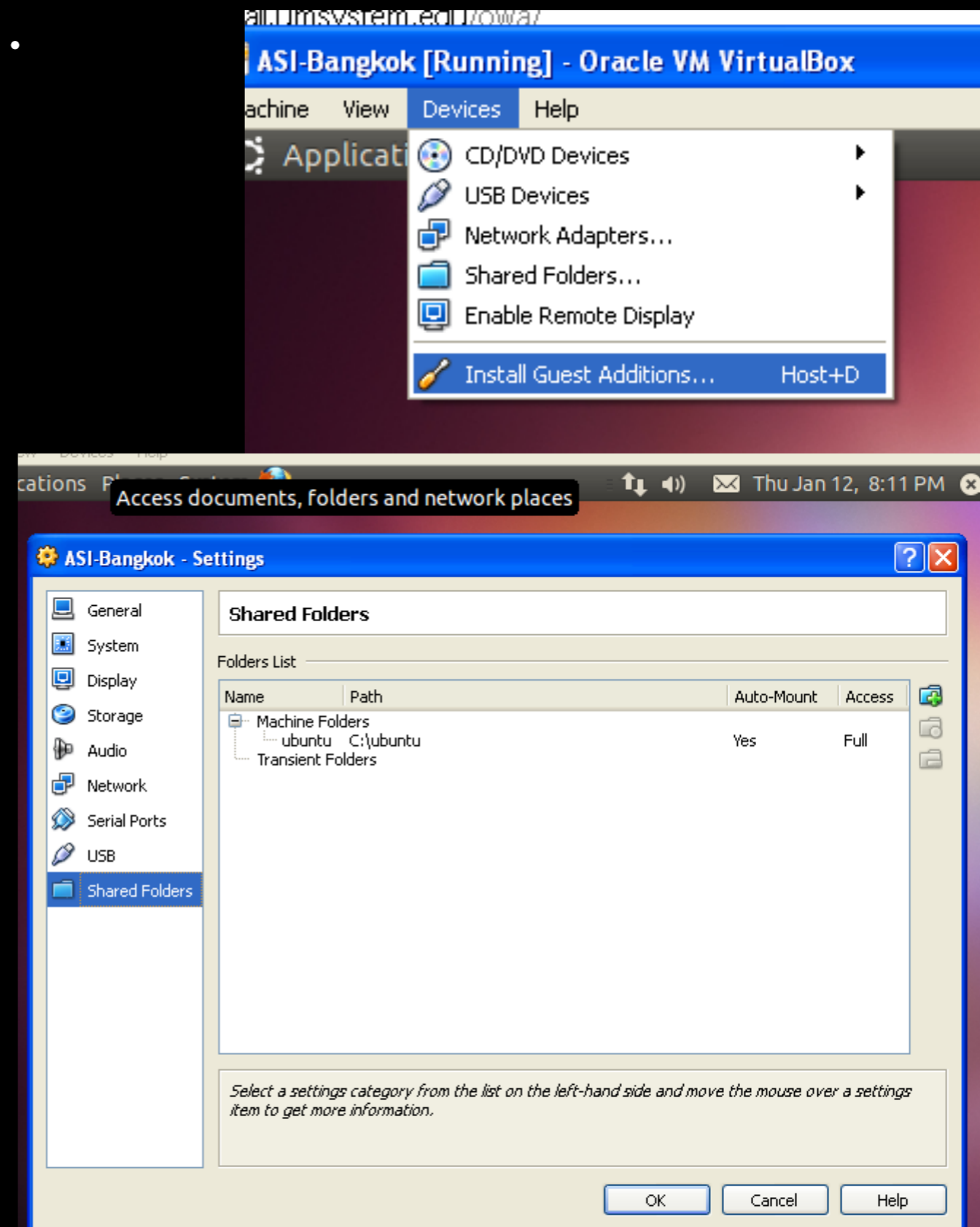
...

- Install Guest Additions
on your Virtual Machine...
- Establish a folder or directory on your Host machine where you plan to share files (e.g. C:\ubuntu, /home/asi/share)
- In the Guest Ubuntu machine:

```
asi>sudo -s
```

```
asi>mkdir /mnt/share
```

```
asi>mount -t vboxsf ubuntu /mnt/share
```



Testing your Installation on your VM ...

```
asi>
```

```
asi>cd hrvoje/ExerciseI
```

```
asi>more README_ExerciseI
```

```
asi> cd MODEL_IL_SYNTHETICS_BUNDLE
```

```
asi>csh create_IL_model.unix
```

THIS SHOULD CREATE A FILE CALLED “model.0”