

Quantum Monte Carlo and the CASINO program VIII



Cambridge University International Summer School
Sunday 4th August - Sunday 11th August 2013
The Apuan Alps Centre for Physics @ TTI, Vallico Sotto, Tuscany, Italy

www.vallico.net/tti/tti.html

This is the programme for the eighth international quantum Monte Carlo Summer School to be held at TTI. The event will be organized and run by the TCM Group from Cambridge University's Cavendish Laboratory. The purpose of the school is to provide the student with a thorough working knowledge of the quantum Monte Carlo electronic structure method as currently used in quantum chemistry and condensed matter physics, and to show him or her how to use the Cambridge CASINO QMC program for serious scientific research. The course will consist of around 20 hours of lectures by recognized experts in the field and a series of practical exercises in using the CASINO program led by its authors. No previous background other than a basic knowledge of quantum mechanics is assumed. Knowledge of density functional theory and similar methods is useful, as is an ability to work within a Unix/Linux environment. As with all events at the Institute, formal lectures are restricted to the mornings, and participants are encouraged to spend much of the rest of the day thinking, contemplating, and discussing the issues at hand. Practical computer exercises after lunch will be followed by a programme of recreational activities such as mountain walks, cave trips, and city visits organized for the latter half of most afternoons; the days generally conclude with evening meals in local family restaurants.

1 LIST OF REGISTERED PARTICIPANTS

Yasmine Al-Hamdani	University College London, U.K.	y.al-hamdani at ucl.ac.uk
Tadeusz Andruniów	Politechnika Wroclawska, Poland	tadeusz.andruniow at pwr.wroc.pl
Can Ataca	MIT, U.S.A.	ataca at mit.edu
Samaneh Ataei	University of Tehran, Iran	samaneh.ataei at ut.ac.ir
Salvatore Cardamone	University of Manchester, U.K.	sav.cardamone at gmail.com
Ambesh Dixit	Indian Institute of Technology Jodhpur, India	ambesh at iitj.ac.in
Guillaume Ferlat	University of Paris, France	Guillaume.Ferlat at impmc.upmc.fr
Laura Giacometti	University of Cagliari, Italy	laura.giacopetti at dsf.unica.it
Yury Gladush	Institute for Spectroscopy RAS, Troitsk, Russia	gladush at isan.troitsk.ru
Cecilia Goyenola	Linköping University, Sweden	cecgo at ifm.liu.se
Blazej Jaworowski	Wroclaw University of Technology, Poland	jmvarelse at gmail.com
Manuel Perez Jigato	Centre de Recherche G. Lippmann, Luxembourg	perez at lippmann.lu
Peter Korir	University of Eldoret, Kenya	korirpeter at gmail.com
Matthew Malcomson	University of Lancaster, U.K.	m.malcomson at lancaster.ac.uk
Jana Mathauserová	Charles University in Prague, Czech Republic	jahodovykomplot at gmail.com
Marcos Menéndez	University of Oviedo, Spain	marcoskeke at gmail.com
Elaheh Mostaani	University of Lancaster, U.K.	emostaani at gmail.com
Minh Tam Nguyen	KU Leuven, Belgium	MinhTam.Nguyen at chem.kuleuven.be
Antonio Noto	University of Palermo, Italy	ntonntn at gmail.com
Eduardo Menendez Proupin	University of Chile, Santiago, Chile	eariel99 at gmail.com
Samuel Ridgway	University of St. Andrews	sr69 at st-andrews.ac.uk
Kayahan Saritas	MIT, U.S.A.	kayahan at mit.edu
Pedro Silva	Universidade Fernando Pessoa, Porto, Portugal	pedros at ufp.edu.pt
Kyrylo Snizhko	University of Lancaster, U.K.	k.snizhko at lancaster.ac.uk
Ludmila Szulakowska	Wroclaw University of Technology, Poland	ludmila.szulakowska at gmail.com

Family: Dora Silva, Sofia Silva (12), Alina Veitia, Maya Menendez (7) and Inés Menendez (3)

Staff: Mike Towler, Samantha Keil, Saska Towler, Jamie Towler, Neil Drummond, Pablo López Ríos, Martin Krupicka, Lisa Johnson-Davies

2 FLIGHTS AND TRANSPORT

2.1 From Pisa

This section gives details on how to get to the Institute for people flying into our recommended airport: Galileo Galilei Airport, Pisa. It is also possible to fly to Florence (Firenze) which is only slightly further away, but flights to this airport are limited. In principle one could also fly to other airports such as Perugia, Bologna, Ancona, Parma, Milano, Verona, Genova or Roma but you should count on a train ride of up to four or five hours to get to the Institute (we can arrange this for you). A list of airlines flying to Pisa from destinations within Europe is given on the TTI web page (see ‘Flying to Italy’ in the left-hand column). Americans should note that Delta Airlines now operate a direct service to Pisa from New York. Further details about transport, including how to drive to the Institute, are given on the TTI web site.

If possible you should aim to arrive at Pisa airport on Sunday 4th August (preferably before dinner at 19:30 - remembering that the staff member who has to come and pick up latecomers will also miss their dinner!). Early arrival or late departure is possible in principle - but you will almost certainly be press-ganged into manual labour - please contact us beforehand to organize this.

How to get to TTI from Pisa airport on Sunday 4th August:

Go to Pisa Centrale train station. The best way to do this from the airport is by taxi (costs around 9 EUR) - you should see the taxi rank as soon as you exit the terminal building. The *stazione* (phonetic: ‘statsionary ferrovia’) is a 5-minute journey. If the taxis are on strike or you are desperate to save a few Euros you could alternatively take a short train ride from Pisa Aeroporto station (which you get to by walking out of one end of the terminal building - turn left as you walk into the main hall) or you could - presumably

- take a bus. In principle, I suppose you could even walk (though not with heavy luggage). Once at Pisa Centrale station you then need to get a train to Barga-Gallicano. This is an isolated station north of the city of Lucca somewhere along a branch line going up the valley of the river Serchio into the mountains (see the map on the TTI web site). Depending on the train time, you may need to change at Lucca to get the train north. The train will usually be flagged as going to “Aulla-Lunigiana”, “Minucciano”, “Piazza al Serchio” or “Fivizzano”. See the printed timetables on the station wall to check where each train stops, and the electronic screens for the departure platform. Note that in Italian, Departures is ‘Partenze’, and Arrivals is ‘Arrivi’ - make sure you’re looking at the right timetable or screen.

The train in question is a little unimportant train, and for some reason only tickets for big important trains seem to be available on the internet. It is easy to buy tickets on the station platform either from a human (“Uno a Barga-Gallicano. Solo andata.”) or from one of the ticket machines (which can be requested to speak English). On all Italian train journeys you are supposed to validate (‘convalidare’) your ticket by inserting it into one of the small wall-mounted green and white machines in the station or you may have to pay a fine - though I have never seen a ticket inspector on any of the trains that you will take. Note that Italian trains are very (even absurdly) cheap by international standards, particularly British ones. The ticket should cost around 4 to 6 Euros.

One final thing that has caused confusion in the past: at Lucca and Pisa some of the trains leave from a platform (‘binario’) labelled ‘1TO’ or ‘1TE’, meaning 1 Tronco Ovest (west) and 1 Tronco Est (east). This is *not the same* as Platform 1. All the ‘through platforms’ are labelled 1, 2, 3 etc., and 1TO and 1TE refer to separate ‘terminus platforms’ which you can find by walking to either the west or east end of platform 1.

At Barga-Gallicano station you should find a TTI representative who will meet each Sunday train as required and take new arrivals to the Institute. If no-one is there you can wait in the station café - do call if you have to wait more than five or ten minutes. Clearly we need to know in advance the time of the train on which you intend to arrive. The timetable is linked from the TTI web site, but all Sunday train times are in fact given in the table below. Note that the last train from Pisa is at 19:50 so it would be a good idea to arrive earlier in the day if possible (particularly as you may wish to attend the welcome dinner at 19:30).

In emergencies it is possible to get a taxi to Vallico Sotto from the station but in general this needs to be pre-booked - see the instructions on the web site (Barga Taxi : bargataxi@libero.it Tel. 331 3378051 or 339 5678336). If you are a non-Italian speaker who hasn’t pre-booked and you need to talk to the guy (Massimo) on the phone you will find he doesn’t speak English so just say (phonetic) “Taxi a Vallico Sotto da la stasjonay di Barga-Gallicano?” or similar down a phone at him - the trip should cost 35 Euro. Note that “I don’t speak Italian” is “Non parlo italiano.”

In case of problems contact Mike on his mobile phone - 00 44 7432 491113. Additional assistance may be available from Samantha Keil on 00 44 7979 554034 (though be aware that she is geographically challenged and doesn’t know where anything is). TTI has two direct phone lines (0583 761608 and 0583 1805441) but these should be used as a last resort, since it is unlikely anyone useful will be near them.

3 TRAIN TIMETABLES

See www.trenitalia.com and click the British flag at the top right.

Sunday 4th August - Pisa Centrale to Barga-Gallicano stations

dep. Pisa	arr. Lucca	dep. Lucca	arr. Barga-Gallicano
05:25			06:52
07:50			09:15
08:50	09:17	10:02	10:52
13:43			14:53

14:50	15:17	16:20	17:01
17:50			19:00
18:50	19:17	19:40	20:27
19:50			21:31

Sunday 11th August, Barga-Gallicano to Pisa Centrale station

dep. Barga-G.	arr. Lucca	dep. Lucca	arr. Pisa
06:39			08:13
07:59	08:41	09:42	10:13
09:39			11:09
12:00	12:46	13:12	13:54
15:18	16:05	16:42	17:13
17:32	18:16	18:42	19:13
20:16			22:13

3.1 From Milano

People coming from more distant countries often only have a choice of coming to Milano airport. Here is a summary of advice for them.

Travel from Milano Malpensa airport to Milano Centrale train station:

The Malpensa Express train departs from Terminal 1 for Milano Centrale train station around twice an hour. (One can also get to other Milano stations Cadorna, Bovisa and Saronno but Centrale is the main train station where you need to catch onward trains. Note that the Malpensa-Centrale line only opened in 2010 so you may still encounter outdated advice that you need to travel to Cadorna from the airport). On weekdays, the first train departs Malpensa at 05.43, the last train departs 22.43. Journey time is around 40-50 minutes. Fare: 10 Euro one-way - don't get in a taxi as it will cost you 65+ Euro.

Travel from Milano Linate airport to Milano Centrale train station:

This smaller airport is much closer to the centre than Malpensa, and therefore it is feasible to use buses or taxis to get to the train station. See the Linate Airport section of wikitravel.org/en/Milan for details about the various options.

From Milano Centrale train station to Barga-Gallicano

Sunday 4th August 2013

From Milano Centrale as above. Then choose one of the following trains - the 08:10 and 13:10 are probably best since there is only one change, and no later train will get you to Vallico Sotto in time for dinner. (There are other possibilities, but they involve tricky 4 train connections, or getting up too early).

OPTION 1 - (from 24.70 EUR) *** - BEST

Milano Centrale	08:10	--> Pisa Centrale	12:21
Pisa Centrale	13:43	--> Barga-Gallicano	14:53

OPTION 2 - (from 34.70 EUR) *** - SECOND BEST

Milano Centrale	13:10	--> Pisa Centrale	16:57
Pisa Centrale	17:50	--> Barga-Gallicano	19:00

OPTION 3 (from 16 EUR)

Milano Centrale	14:05	--> La Spezia Centrale	17:19
La Spezia Centrale	18:23	--> Aulla Lunigiana	18:40
Aulla Lunigiana	19:02	--> Barga-Gallicano	20:15

OPTION 4 (from 39.35 EUR)

Milano Centrale	14:25	--> Genova Piazza Principe	16:14
Genova Piazza Principe	16:52	--> Viareggio	18:39
Viareggio	19:00	--> Barga-Gallicano	20:27

OPTION 5 (from 14.70 EUR)

Milano Centrale	16:05	--> Viareggio	19:58
Viareggio	20:10	--> Lucca	20:27
Lucca	20:44	--> Barga-Gallicano	21:31

If you fly into Milano before Saturday, another option is to stay in a suitable hotel in Milano and take a train the day after.

Before you arrive, write down the details of suitable hotels near the station. There is a good site where you can book these and print out maps at:

<http://www.traveleurope.it/milano.htm>

or better still:

http://www.traveleurope.it/milan/milan_central_station.shtml

The Hotel Monopole seems a good one to me (prices from 60 EUR)

4 SPECIFIC TRAVEL PLANS

Elaheh Mostaani

Arr Pisa Sat 27 July 19:35. Train dep Pisa 20:40 arr Barga-Gallicano 22:20
 (will attend QMC in the Apuan Alps conference).
 Dep Pisa Sun 11 Aug 11:50

Martin Krupicka

Arr Pisa Thu 1 Aug. Train arr Barga-Gallicano 17:25 (TAXI BOOKED)
 (will attend QMC in the Apuan Alps conference).
 Dep Firenze Mon 12 Aug 17:00

Neil Drummond

Arr Roma 13:20 Tue 30 July. Train dep Roma Term. 15:59 arr Barga-Gallicano 21:31
 (will attend QMC in the Apuan Alps conference)
 Dep Pisa 15:15 Fri 9 Aug (Train dep Barga-Gallicano 08:43)

Yasmine Al-Hamdani

Arr Pisa 09:30 Sat 3 Aug. Train dep Pisa 13:43 arr Barga-Gallicano 14:53
 TO BE PICKED UP BY ANATOLE VON LILIENFELD
 Dep Pisa 16:20 Sun 11 Aug

Samaneh Ataei

Arr Milano 12:30 Fri 2 Aug. Train Sat 3 Aug 08:10 arr Barga-Gallicano 14:53

TO BE PICKED UP BY ANATOLE VON LILIENFELD

Dep Sun 11 Aug for Trieste. Flight Milano 14:30 Fri 16 Aug

Jana Mathauserova

Arr Pisa 15:00 Sat 3 Aug. Train Pisa 17:50 Sun 4 Aug arr Barga-Gallicano 19:00

TO BE PICKED UP BY MARTIN KRUPICKA

Dep Pisa 10:40 Tue 13 Aug (TWO EXTRA NIGHTS REQUIRED)

Antonio Noto

Arr Pisa 09:45 Sun 4 Aug. Train dep Pisa 13:43 arr Barga-Gallicano 14:53

Dep Pisa 20:00 Sun 11 Aug

Salvatore Cardamone

Arr Pisa 11:05 Sun 4 Aug. Train dep Pisa Aero. 13:18 arr Barga-Gallicano 14:53

Dep for Firenze from Barga-Gallicano 15:18 Sun 11 Aug

Matthew Malcomson

Arr Pisa 10:15 Sun 4 Aug. Train dep Pisa 13:43 arr Barga-Gallicano 14:53

Dep Pisa 10:45 Sun 11 Aug

Manuel Perez Jigato

Arr Pisa 12:45 Sun 4 Aug. Train dep Pisa 13:43 arr Barga-Gallicano 14:53

Dep Pisa 13:20 Sun 11 Aug

Laura Giacopetti

Arr Pisa 09:35 Sun 4 Aug. Train dep Pisa 13:43 arr Barga-Gallicano 14:53

Dep Pisa 16:30 Sun 11 Aug

Guillaume Ferlat

Arr Lucca Sat 3 Aug. Train dep Lucca Sun 4 Aug 14:10 arr Barga-Gallicano 14:53

Dep Sun 11 Aug

Samuel Ridgway

Arr Pisa 11:05 Sun 4 Aug. Train dep Pisa 13:43 arr Barga-Gallicano 14:53

Dep Pisa 11:50 Sun 11 Aug

Minh Tam Nguyen

Arr Pisa 12:15 Sun 4 Aug. Train dep Pisa 13:43 arr Barga-Gallicano 14:53

Dep Pisa 12:40 Sun 11 Aug

Blazej Jaworowski

Arr Bologna 08:10 Sun 4 Aug. Train arr Barga-Gallicano 14:53

Dep for Milano Sun 11 Aug - stay one night. Dep Milano 16:20 Mon 12 Aug

Ludmila Szulakowska

Arr Bologna 08:10 Sun 4 Aug. Train arr Barga-Gallicano 14:53

Dep for Milano Sat 10 Aug. Dep 2:15pm by taxi (TO BE BOOKED)

Yury Gladush

Arr Milano Thu 2 Aug. Train dep Milano 08:40 arr Barga-Gallicano 14:53

Dep Mon 12 Aug (EXTRA NIGHT REQUIRED)

Kyrylo Snizhko

Arr Pisa 12:45 Sun 4 Aug. Train dep Pisa 14:50 arr Barga-Gallicano 17:01

Dep Pisa 13:20 Sun 11 Aug

Tadeusz Andruniow

Arr Pisa 12.45 Sun 4 Aug. Train dep Pisa 17.50 arr Barga-Gallicano 19.00

Dep Pisa 13.20 Sun 11 Aug (Train dep Barga-Gallicano 9.39)

Ambesh Dixit

Arr Pisa Centrale 1:59 Sun 4 Aug. Train dep Pisa 17.50 arr Barga-Gallicano 19.00

Dep Pisa Centrale 16:52 Fri 9 Aug

Peter Korir

Arr Milano 08:10 Sun 4 Aug. Dep Milano Centrale 13:10 arr Barga-Gallicano 19:00

Dep ??

Marcos Menendez

Arr Milano 12.05 Sun 4 Aug. Train dep Milano 14.25 arr Barga-Gallicano 20:27

Dep Pisa 13.20 Mon 12 Aug (EXTRA NIGHT REQUIRED)

Cecilia Goyenola

Arr Milano 12:05 Sun 4 Aug. Train dep Milano 14:25 arr Barga-Gallicano 20:27

Dep Milano 17:20 Sun 18 Aug

Can Ataca, Kayahan Saritas

Arr Roma 17:00 Sun 4 Aug. Drive 5-seater car to TTI arrive c. 11pm.

Dep Roma Sun 11 Aug

Eduardo Menendez Proupin, Alina Veitia, Maya Menendez, Ines Menendez

Arr by rental car from Madrid Sun 4 Aug.

Dep by rental car Sun 11 Aug.

Pedro Silva

Arr Florence 14:20 Sun 4 Aug. Drive rental car to TTI.

Dep ??

Pablo Lopez Rios

Arr Sun 4 Aug am. Drive rental car to TTI

Dep Sat 10 Aug pm.

5 ACCOMMODATION

TTI, ATTIC - one single bed, one cot

Mike Towler, Jamie Towler

TTI, NURSERY - one single bed

Ludmila Szulakowska

TTI, PLAYROOM - two single beds, one double bed

Neil Drummond, Pablo Lopez Rios, Samuel Ridgway

TTI, PINK ROOM

Samantha Keil, Saska Towler

TTI, LILAC ROOM - two single beds
Jana Mathauserova
Yasmine Al-Hamdani

TTI, TINY ROOM - one single bed
Lisa Johnson-Davies

TTI, RED ROOM - one double bed
Cecilia Goyenola

TTI GARDEN ROOM, two single beds (bunk)
Marcos Menendez, Yury Gladush

DOCTOR'S HOUSE, FIG TREE ROOM - one double bed, one single bed
Pedro Silva, Dora Silva,
Sofia Silva (single bed off the floor required - allergic to stuff)

DOCTOR'S HOUSE, UPPER TWIN ROOM - two single beds
Tadeusz Andruniow, Blazej Jaworowski

DOCTOR'S HOUSE, UPPER SINGLE ROOM - one double bed
Antonio Noto

DOCTOR'S HOUSE, LOWER APARTMENT - one double bed, two single bunk beds
Eduardo Menendez Proupin
Alina Veitia
Maya Menendez
Ines Menendez

CASA FRANCA - ROOM 1 - 1 double bed
Minh Tam Nguyen

CASA FRANCA - ROOM 2 - 1 double bed
Ambesh Dixit

CASA FRANCA - ROOM 3 - 1 double bed
Peter Korir

CASA FRANCA - ATTIC - 1 single bed

CASA GIANPIERO - ROOM 1 - 1 double bed
Guillaume Ferlat

CASA GIANPIERO - ROOM 1 - 2 single beds
Can Ataca
Kayahan Saritas

CASA LUCIANA - ROOM 1 - 1 double bed
Samaneh Ataei

CASA LUCIANA - ROOM 2 - 1 single bed
Laura Giacopetti

CASA SARDA - ROOM 1 - 1 single bed
Elaheh Mostaani

CASA LONTANA - ROOM 1 - 1 double bed, 1 single bed
Manuel Perez Jigato, Kyrylo Snizhko

CASA LONTANA - ROOM 2 - 1 double bed
Martin Krupicka

CASA LONTANA - ROOM 3 - 1 sofa bed

BEDOUIIN TENT (www.vallico.net/tti/tti_tent.html)
Matthew Malcomson
Salvatore Cardamone

DA SANDRA
(multiple commercial rooms/apartments available)
DA SANDRA - ROOM 1 - 1 double bed

DA SANDRA - ROOM 2 - 1 double bed

DA SANDRA - ROOM 3 - 1 double bed
Unavailable

DA SANDRA - APPARTMENT 1 - 1 double bed

DA SANDRA - APPARTMENT 2 - 1 double bed (+ 2 children's beds if required)

CASALE DEI RUSCELLI (www.casaledeiruscelli.com)
(posh apartments for rich people requiring privacy - 10 min drive - car and extra payment required)

AWAITING ROOM ASSIGNMENT
None

6 SUMMER SCHOOL VEHICLES

39 people, 43 places

17-seat minibus (RHD) - Driver : Mike Towler
9-seat rental car (LHD) - Driver : Pablo Lopez Rios (dep. c. 5pm Sat)
7-seat rental car (LHD) -Driver : Pedro Silva
6-seat Fiat Multipla (RHD) - Driver : Martin Krupicka
5-seat rental car (LHD) - Driver : Eduardo Menendez Proupin

SPARE DRIVERS FOR EMERGENCIES (please bring driving license)
Matthew Malcomson
Yury Gladush

7 THINGS TO BRING WITH YOU

- Notebook and pen.
- You can bring a wireless-enabled laptop if you want - see note in Technical Equipment section. We have around twenty of them so this probably not necessary.

- Summer hiking gear such as boots, socks, mini-rucsacs etc. Last year somebody managed to do all the walks in a pair of flip-flops but this is emphatically not recommended.
- Italian plug converters if you want to plug anything in (we have some spare but probably not for all countries). Our sockets mostly have two round pins (with an optional third one between them). There are two types of thin prongs on European adaptors. You want the thinner of the two. Just to confuse things, there are also lots of English plug sockets into which English equipment can be plugged directly (including the majority of those in the lecture hall).
- Some Euros for spending in restaurants and shops (minimum 25 Euros per day). Please note that there is no easily accessible cash machine near the Institute, and although we might pass them from time to time on our afternoon trips, large numbers of people getting money out can cause considerable delays. There is a cash machine in Pisa airport to your left as you emerge into the arrivals hall (look under the escalator leading to the upper level). Go up the escalator to find an alternative cash machine if that one isn't working. A few years ago a cash machine was in fact setup in Fabbriche di Vallico a few kilometres away from the Institute - this is now much less flaky than when it was first installed but relying upon it to actually give you money would not be sensible.
- People who intend to visit caves or canyons (most of you I hope) should bring some clothes/shoes that you don't mind getting wet.
- Climbing/caving equipment (harness, boots, helmet, via ferrata 'absorber', head torch) if you intend to take part in such activities and already have some (don't buy them just for this trip). We have a fair amount of gear we can lend but not enough for everyone.
- Sunscreen. It is likely to be quite hot in the first week of August, but note that because we are in the mountains occasional afternoon rain showers are not unknown.
- A towel.
- Light sleeping bag (if you intend to sleep in the Bedouin tent).
- Hay fever tablets. Some students who have lived in darkened basements in huge cities most of their lives sometimes have difficulty with pollen when they come to live in the countryside.
- Swimming costume (if you want to go swimming).
- Earplugs - if you are sharing a room - to avoid being disturbed by snoring people.

In the tradition of events at this venue, you might also optionally like to bring

- A nice bottle of wine (or whatever passes for it in your country).
- An interesting thing

8 SUMMER SCHOOL SCHEDULE

Here is the proposed schedule for the Summer School. The main instructors are Dr. Mike Towler, Dr. Neil Drummond and Dr. Pablo López Ríos; they will be assisted by Dr. Martin Krupicka. One or two of the students may already have some experience with QMC: if that is the case, you are warmly encouraged to give a little ten-minute presentation of what you have done so far - contact us to arrange this. People are also welcome to bring posters of your work which can be attached to various flat surfaces in the monastery.

Sunday 4th August

ARRIVALS

~7:30pm : Buffet dinner in the Institute garden.

Monday 5th August

8.30am : Mike Towler - "Quantum Monte Carlo : the basics. Overview of everything. Why QMC? Basic MC integration/VMC/DMC theory. Many-electron wave functions - aperiodic and periodic. Basic solid-state ideas - reciprocal space, k points etc. Idea of wave function optimization Representation of orbitals. Basis sets. Spin. Excited states. Total energy." (2.5 hours)

11am : BREAK

11.30am : Mike Towler - "An introduction to the CASINO program" (1 hour)

12:30pm LUNCH

PRACTICAL SESSION -

1.30pm-3pm Distribution, setup and compilation of the CASINO program (MDT)

3pm EXCURSIONS

Trip to Alto Matanna. Four spectacular walks of varying difficulty. See the entire Versilia coast, Elba, Corsica and sometimes even France from the easily accessible summits of some of the more beautiful scenery in the Apuan Alps. Bring one of the Institute's antique telescopes to watch the more courageous of you scale the 500 foot cylindrical barrel of Monte Procinto.

Followed by drinks and dinner in 19th Century Alpine hotel.

- Balloon station walk
- Monte Matanna walk
- Monte Procinto climb
- Grotta all'Onda walk (Neanderthal cave)

DINNER : Alto Matanna 0584 776005 (BOOKED FOR 39)

Tuesday 6th August

8.30am : Pablo Lopez Rios - "Statistical analysis of VMC results. Basic DMC - how to run a calculation. How to extract and analyze DMC results. Serial correlation. Timestep optimization. Correlation time. Reblocking. Use of graphit program. Other statistical issues." (1 hour)

9:30am : Neil Drummond - "Jastrow factors and wave function optimization" (2 hours)

11:30am : BREAK

11:45am : Pablo Lopez Rios - "Pseudopotentials for quantum Monte Carlo" (40 minutes)

12:30am : Mike Towler - "Pseudopotentials : practical details" (30 minutes)

1pm LUNCH

2pm PRACTICAL SESSION -

Basic use of CASINO program - simple VMC, DMC calculations (PLR)

EXCURSIONS

- Turrite di San Rocco canyon walk
- Tana di Cascaltendine + search for the Cave of the Fairies
- One hour walk around Barga countryside (then town centre). Optional swimming.

DINNER : Da Sandra 0583 761712 (BOOKED FOR 39)

Wednesday 7th August

8.30am : Neil Drummond - "Solid state calculations. Interactions and finite size effects" (2 hours)

10.30am : BREAK

11am : Pablo Lopez Rios - "Orbital optimization, multideterminants and backflow, with numerical results" (2 hours)

1pm LUNCH

2pm PRACTICAL SESSION

- Wave function optimization with CASINO (NDD)

EXCURSIONS

- Walk Matanna to Monte Forato (rock arch) to Fornovolasco
- Tana che urla ('Cave that screams') exploration + optional cave hunting
- Grotta del Vento tourist cave
- Parco del Levigliese : supervised climbing and canyoning
- Fornovolasco church and flood frescoes
- Swimming at Bagni di Lucca

DINNER: Eremo di Calomini 0583 767020 (BOOKED FOR 39)

Thursday 8th August

8.30am : Neil Drummond - "Advanced diffusion Monte Carlo. Timestep errors. Green's function modifications. Fixed-node approximation. Wave function nodes. Fermion sign problem (release node and fermion Monte Carlo, optimizing the nodes). Expectation values in DMC. Future walking etc. Population explosions." (1.5 hours)

10.00am : BREAK

10.15am : Mike Towler - "Scaling with system size. Localized orbitals and localized basis sets (Gaussians/blips). All-electron calculations. Heavy atoms - timestep errors. Scaling with number of processors. Exploitation of parallel hardware. CUDA and exploitation of GPUs. Future trends in parallel computing. (1 hour)

11:15am : BREAK

11:30am : Pablo Lopez Rios - "Applications : systems with atoms" (1.5 hour)

1pm LUNCH

PRACTICAL SESSION

- Trial wave function generation with other programs (CRYSTAL/PWSCF/CASTEP etc.
 - NDD/MDT)
- Advanced use of the CASINO program (PLR)

A DAY IN THE VILLAGE

- Relaxing, sunbathing, reading, studying, discussing
 - Metal detecting
 - The Vallico Sotto Game
 - Abseiling to the Buca della Fate di Vallico di Sotto
 - Football match - Vallico Sotto against the world/Vallico Sotto contro il mondo
- DINNER : Provided by the ladies of Vallico Sotto (BOOKED FOR 39)

Friday 9th August

8.30am : Mike Towler - "Forces and derivatives. Dynamical calculations. Expectation values other than the total energy computable with CASINO. Free energy etc. (1.5 hours)

10.00am : BREAK

11.00am : Neil Drummond - "Applications : electron-only systems (fluid phase, Wigner crystals etc.) Electron-hole systems. (1 hour)

12.00am : "Ask Pablo" - QMC Q+A session. Advice on using QMC for your particular problems.

1pm LUNCH

PRACTICAL SESSION

- Advanced use of the CASINO program (PLR - continued)
- General CASINO applications.

EXCURSIONS

- Orrido di Botri/Montefegatesi
- Lucca

7.30pm DINNER : Al Laghetto 0583 75798 (BOOKED FOR 39 - TO CHANGE TO 38)

Saturday 10th August

MORNING

9.am : Student talks (if any)

9.30 am

Exercises with CASINO and QMC exam (with prizes)

AFTERNOON/DINNER

- Long distance excursion to Florence/Cinque Terre or similar

11.30 pm

Prize giving ceremony in the monastery garden.

Sunday 11th August

DEPARTURES

9 EXCURSIONS AND ACTIVITIES

Here is the list of excursions and activities generally offered at TTI. Clearly with the Summer School we have less time in the afternoons than is normal because of the need to run CASINO practical sessions so

some of these excursions will no longer be feasible. Nevertheless we shall try to get through quite a few of them, according to the time available and the tastes and interests of the students.

The various activities are divided into categories according to the physical effort involved. As there will be more than 30 people at the Summer School, it is envisaged the group may split into two, with the hot young muscular virile people doing the strenuous excursions, and the lazy, old and corpulent doing the more relaxed activities. What to do can be debated in the morning each day - all according to taste. Of course, as there will be multiple vehicles, we can do different activities simultaneously.

9.1 Very strenuous activities

- Climb the peak of Pizzo d'Uccello. Requires early start with no other activities (e.g. day before conference). See www.tcm.phy.cam.ac.uk/~mdt26/tti2/photos/pizzo_duccello.jpg. Enough said. They don't call it the 'Matterhorn of the Apuan Alps' for nothing.
- The ascent of Monte Procinto. This is a huge cylindrical rock tower with a belt of trees around its middle from which rise 500-foot walls, overhanging on every side. Michelangelo had the idea of carving it into a gigantic sculpture along the lines of Mount Rushmore but never got round to it. You can see the mountain here: www.vallico.net/procinto.jpg. Yes - the walls are more or less vertical, but there is a *via ferrata* to clip yourself onto. Instruction, assistance, and the necessary equipment can usually be supplied - but we only have about eight harnesses so bring your own if you have one!
- Reach the high peak of Pania della Croce from Piglionico (described as 'The finest peak in the whole of Italy' in *Below the Snow Line* - one of the 19th century books in the TTI Antiquarian Library). Also features in Dante's *Divine Comedy*. This defeated some of TTI finest mountaineers for several years before they finally succeeded in 2007 (note - it isn't that hard if you move quickly).
- Find the spectacular natural rock bridge of Monte Forato (under which someone once flew a bi-plane). Start from Fornovolasco (lots of up) or from Matanna (much easier) or even have two groups that meet in the middle and exchange car keys. New for 2009: there is a fun *via ferrata* traverse on the way to the arch from Matanna, and we will do a new route via Foce di Valli.
- Find the Neanderthal cave (Grotte all'Onda) down the slope from the balloon station near Matanna. *"This vast grotto stretches 40 x 60 meters and it originally hosted numerous internal tunnels, which are obstructed today. Its enormous cavity offers important evidence that suggests the frequency with which people entered the grotto, from pre-historical times to more recent periods. The first people to use the cave were Neanderthals; they hunted throughout the surrounding area and probably used it to hoard their tools and weapons, together with the bones of the animals they cooked. Hunters from the Superior Palaeolithic period (Homo Sapiens) lived in the more external part of the grotto where they set up a giant hearth. Later, Neolithic farmers and shepherds planted their huts in the shelter of the grotto's vast vault, carrying out their daily activities there during many seasons. This cave was also used during the Neolithic period (the Bronze Age), during which new models were developed for decorating ceramic. During this period, new raw materials, imported from distant locations, were adopted to make special equipment. From the post-Bronze Age until recent times, the grotto was not continuously frequented."*
- The new Geoscopio web site (link/instructions at www.vallico.net/tti/tti_mountaineering.html) shows precise locations of all of the thousands of caves in Tuscany (even the crap ones) together with a brief technical description and a plan of the cave. Interesting little expeditions may be made that have the aim of finding the entrance to particular caves, as well as exploring them. This is of course the most fun that a boy can have. The Apuan Alps have more caves than you can possibly imagine, so this will still be a viable activity in 2050. In particular, ask Mike about the untried Campolemisi, Fabbriche di Vallico, Motrone, and Antro della Paura expeditions.
- Explore the canyon of the Turrite di San Rocco river. This starts from the fork in the river upstream from Fabbriche di Vallico before you get to Gragliana. Take the left-hand fork. The aim is to go all the way through it to take coffee at the cafe near the Chiesa di San Rocco in Turrite, but as of

July 2009 we have been unable to establish if this is feasible. (MDT only had a spare ten minutes and went in a few hundred yards - it seems great). Be prepared to get wet. Someone told me there was a great natural swimming pool in there. Once reaching the village where the cafe is (there is also a children's playground and a nice river) you will have to bribe a local (pool your Euros) to give your driver a lift back via Focchia to your van. Use your initiative here.

- Morning workout. Run from the Institute each morning at 6am to the spectacular summit of Monte Palodina in order to tone up your thigh muscles and pep yourself up in preparation for the morning's talks. Mad people only.
- Complete the Cinque Terre coastal walk, a four-hour excursion through some of Italy's most spectacular scenery, or a similar walk near the famous seaside haven of Portofino.
- *Orrido di Botri* canyon walk. The Orrido is a giant canyon created by the Pelago river in the Apennines (about an hour's drive from the Institute) with deep steep walls as high as 200 metres and in some places only a few metres apart. This is a geologists' and naturalists' paradise. It can only be visited with helmets and suitable clothing you don't mind getting wet. There are some nice long walks in the country above the canyon (watch out for marmites and Royal Eagles - this is one of your best chances to contribute to the TTI Wildlife Photography expedition).
- There are of course any number of spectacular high mountain expeditions in the Apuan Alps and the Institute has a library of guidebooks which you can browse through. Let me know if you want to try anything else (that will fit in the clearly limited amount of time). There is also the TTI Antiquarian library (Mountaineering section) to inspire you.

9.2 Quite strenuous activities

- Go to Alto Matanna at the end of the Turrtecava valley and visit the beautiful nineteenth-century hunting lodge that was once the destination for travellers in Rosetta the Balloon on her aerostatic cableway. See the old balloon station at Foce del Pallone and the extraordinary view. On clear days you can see Elba - 100 miles to the South - and sometimes the even more distant Corsica and the French Alps. Come back over the top of Monte Matanna and descend back to the lodge. Take one of the Institute's antique telescopes with you.
- From the Matanna hotel, climb up to the cross on the adjacent ridge for a spectacular view of Monte Procinto, Stazzema and the Apuan Alps. From there you can climb Monte Matanna the other way around, or visit the donkey and his little horse friends who live on the top of Monte Nona. Or you could go on a longer walk below the Giant West Wall of Nona, threading past Monte Procinto, and round the back of Monte Nona which will take several hours. Finish up the day with a fabulous dinner in the Matanna hotel.
- Take part in the latest expedition to the ancient cave known as the *Tana di Cascaltendine* which is the subject of Pietro Magri's 1880 book *An expedition to Mount Gragno and the Cave of Cascaltendine* as translated by Mike and available on the TTI web site (click the Local History Projects link). The 2007 summer school crew were able to photograph the result of the following quote : *'Before coming down from the cavern we used a chisel to inscribe our initials and the year 1880 on both walls of the passage near the entrance.'* This was done in the "Palace of Ismeno" which was the name Magri's group gave to an extensive cave whose entrance is a 6 foot hole about forty feet up a cliff - the full story is on the News from the Towler Institute blog. It is also known that the cave continues for a kilometre beyond where we have penetrated before and this remains to be explored (note that in summer 2007, Mike and Evans went up the big wall in the final chamber with the dangling rope - a place many TTI visitors have visited before - with somewhat amusing consequences - see the blog story 'Bronze Hermaphrodites and the Fat Boy Filter'). Expedition to be followed by cold beers and refreshments in the lovely village of Cardoso, or a circuit of Monte Penna hunting for the lost Cave of the Fairies..
- Visit the Parco del Levigliese adventure park in the next door valley near Fornovolasco:
parcolevigliese.blogspot.com

Beautiful woodland river park (opened summer 2011) based on a theme of legendary Tuscan creatures. Walking. Supervised climbing and canyoning (equipment supplied). Camping and barbecues. New Age area (mediation, yoga and exercise). Canoe excursions. Open every day 10am till 6pm (except Mondays when it opens at 1pm). Tel: 338 2015232 (Christian) mail: icaruscrane@virgilio.it

- Visit the Selva del Buffardello adventure park:

www.selvadelbuffardello.it/index.php?lang=eng

I quote from their web site: “*Among the centuries-old fir trees some acrobatic forest paths, open to everybody, have been created and their aim is to show the wood from a different and adventurous point of view: hanging in the air. It is a challenge for children, youth and adults, who can test their ability with suspension bridges, swinging beams, vertical nets, ropes and obstacles, finding again their lost adventurous spirit. The Adventure Park ‘Selva del Buffardello’ in San Romano in Garfagnana (locality Pra di Lago) is a real novelty in the Appennino Tosco Emiliano. An old wood of two hectares and a half in the heart of Garfagnana, near the natural ‘Parco dell’Orecchiella’, with a wonderful view on the Alpi Apuane and on the Fortezza delle Verrucole (old castle). The park entrance is free if you don’t practise in the adventure paths.*” We have never tried this, but it looks like great fun.

- TTI management has discovered that there is a secret underground tunnel in Vallico which starts from the Doctor’s House next door to the Institute (a former barracks) and which goes up to the Rocchetta above the village (the site of an old castle on the summit of a little hill, where we now pitch the Bedouin Tent). This was used in mediaeval times for escape from the frequent warfare so common in these parts. The supposed entrance to the tunnel was bricked up (we think) in the 1930s - there are a couple of elderly men in the village who vaguely remember it. This summer we hope to unblock the entrance and explore. We also wish to find the upper entrance, so if you know anyone who has a ground-penetrating radar set we can borrow, let us know. This will probably be one of the next thrilling tales in “News from the Towler Institute”.
- Explore the Vallico Sotto mule trail and the spectacular forgotten waterfall of Cascata Pendolina - one of the highest in Italy. Vallico was only connected by road to the outside world in the 1960s - before then people went up and down the *mule trail*. This has now been forgotten and is a little overgrown (though less so following TTI clearing activities) but is still very beautiful. Once we reach the bottom of the valley we will head over the river to the site of the Cascata Pendolina where we will take lunch. On the way back the bravest people will try to ascend the *Canyon of the Pili* carved by the Rio Selvano (you will get wet!). EDIT: and they will fail - I have recently discovered the only way you can feasibly do this is to *descend* from the top. Apparently this canyon is quite famous - the Apians group from Castelnuovo organize tours through it. One of these days I will have to attach myself to one of these expeditions to learn how to do it. Apparently there are 12 major waterfalls to descend - photos and rough maps are linked from the Mountaineering page of the web site.
- Explore *Buca della Freddana* cave near the mule trail from Vallico Sopra to San Luigi. This was (re-)discovered by Mike in Easter 2007 following conflicting and confusing advice from several local old ladies who remembered its existence from 40 years ago. He has also found the upper entrance of the same cave on the summit of Monte Penna - the two are apparently connected by a 1 kilometre passage. The old ladies have advised us not to go inside because of the evil monsters and dark pits that lurk within, but then again, they always say that. Dare you explore?
- Five a side-football (a new fenced pitch was constructed in Vallico a couple of years ago) or regular football (on the local full-sized pitch).
- Rock climbing or low-level bouldering - the Institute should have some ropes and climbing equipment. I’ve read that there is good climbing near the Trombacco damn in the next door Fornovolasco valley - ask MDT for more details. Don’t forget to bring climbing boots and a harness that fits if you want to do this seriously (we have a rope you can borrow).

- Pietro Magri in his 1880 book mentioned above states that there are two other caves in Monte Gragno besides the Tana di Cascaltendine. Today no-one seems to know where they are. Having found the Buca della Freddana, Mike has narrowed down the lost “Cave of the Fairies” to a relatively small area. Can you find it?
- Traverse from Santa Luigi via Monte Palodina and the cliffs of Monte Gragno past the giant karst depression of Pian di Lago to the spectacular Rocca Estense fortress of Trassilico. Come back along the road past La Fornace.
- Explore the *Tana che urla* (the Cave that Screams!) - first explored and scientifically described by Vallisneri in 1726 - off the footpath to Foce di Petrosciano from Fornoalasco. This isn't a tourist cave suitable for your mum - so bring some appropriate clothes and torches. By the summer the Institute should have some proper speleological equipment to hand round. If you can read Italian, have a look at www.buffardello.it/attivita/pubblicazioni/di_alcune_grotte.pdf.
- Go on a beautiful walk over the highest stone railway bridge in Europe to the church in Sambuca.
- Go wild boar hunting.
- Learn to play local sport *palla elastica* (elastic ball) with the village youths.
- Use TTI's two inflatable boats to play on the Turritecava lake - accompanying picnic recommended. Have races. Try to find the Buca del Lago della Turrite Cava (as you sail towards the dam, it is on the left just after the exit of the second road tunnel).
- Go kayaking on the Turritecava. Bring your own canoe.
- Explore the ancient *Vasaio di Motrone* cave in the nearby village of Motrone (see www.apuane2007.it/italiano/vasaio/zona.vasaio.php).

9.3 Relaxed activities

- Visit the Pinocchio park, the Garzoni gardens, and the Collodi butterfly house in Collodi. See www.pinocchio.it/park.htm. From the website: “*Inaugurated in 1956, the Pinocchio Park is no ordinary theme park, but rather a precious masterpiece created by artists of great character working together. The literary itinerary, marked out by mosaics, buildings and sculptures set amidst the greenery, emerges from an inspired combination of art and nature. The path is winding, and the dense vegetation means that every stage on the route comes as an unexpected surprise, with the very plants and trees contributing to create the atmosphere and the episodes in the story of the Adventures of Pinocchio. The Park itself is the site of constantly renewed cultural activities that are always mindful of its roots: exhibitions of art and illustrations inspired by childrens literature and the Story of Pinocchio, puppet-making workshops, puppet and marionette shows and minstrels enliven the visit to the Park, depending on the season.*”. For the gardens: “*The historic Garzoni Garden, one of the most beautiful in Italy, represents a felicitous synthesis between Renaissance geometry and the spectacular quality of the nascent Baroque. The garden is a work of art of rare equilibrium, where the greenery, the flights of steps the water plays and statues form a truly unique ensemble. It is an absolutely unforgettable experience to lose oneself amidst the wonders of this fantastic place: grottoes, theatres carved out of box hedges, statues representing mythological creatures, satyrs, female figures, greenhouses with peacocks, forests of bamboo. An ancient, and somewhat arch tradition considers the visit to be propitious for lovers, and not only on account of the leafy shade and the arbours that offer secluded spots for tender caresses, but also of the maze, a symbolic allusion to the path to follow together throughout life. As soon as we enter the garden we come upon delightful parterres, statues and two large circular pools. Proceeding we then reach two magnificent double ramps of steps featuring a complex hydraulic system that supplies the water plays. These steps lead to the three upper terraces. Beyond is the impressive water staircase, flanked by two female statues representing the eternal rivals Lucca and Florence. At the very top is the statue of Fame blowing into a shell, emerging from which a jet of water traces out a lofty arc. Leading off the main route through the garden are numerous side paths and avenues where we can discover its marvels among the fragrances of the different plants, the plays of light*”

and shade of the vegetation, the intrigue of the mazes and the enchantment of the sculptures. The garden has recently been restored.”

- The Opera Barga festival is usually on at the same time as the conference (25th July-8th August in 2009). Ask Mike in advance for tickets and reservations.
- Look in the latest issue of Lucca "Grapevine" magazine in English for local cultural activities and concerts etc..
- Play with the Institute's Victorian Scientific Instrument Collection.
- Spend the afternoon bathing in the outdoor hot pool at the ancient thermal baths of Bagni di Lucca (one of the most fashionable spots in Europe in Lord Byron's time - the Switzerland of Tuscany!). Followed by shopping, sightseeing and coffee in the town centre.
- Samantha has two other favourite open-air pools at Galliciano and Barga. These are like little beach resorts where one lazes about on deckchairs and has the occasional dip.
- Watch the night sky through the Institute's astronomical telescope.
- Visit the ancient city of Barga (www.barganews.com) for an afternoon's relaxed sightseeing, shopping and culture.
- Visit the beautiful city of Lucca.
- Visit Castelnuovo di Garfagnana, where you can find Andrea's (the 'Indiana Jones of the Garfagnana') famous Osteria, where all day you can sample fabulous local wines, cheeses and snacks.
- Follow in the footsteps of Michaelangelo, and visit some of the Apuan Alps famous marble quarries.
- Day trip to Florence.
- Drive to the next valley along from ours over a spectacular high mountain road where the eagles live. Visit the Grotta del Vento - the Cave of the Winds (www.grottadelvento.com). This is the most famous cave system in Tuscany and the visitor will enjoy a spectacular and bizarre landscape of caverns and lakes. Take a pullover as the temperature is a reliable 10 degrees the whole year round. Then head down the valley to visit the *Eremo di Calomini* - an ancient monastery built into a high steep cliff.
- Table football and drinking in Fabbriche di Vallico.
- Horse riding at La Fornace.
- Various mild short walks around the Institute.
- Digging the Institute garden and doing little DIY things like restoring the church or clearing paths (I say this merely in hope..).

9.4 Very relaxed activities

- TTI now has a high-definition video camera. Make a film of life at one of the world's best conferences.
- Budding archaeologists may use the TTI metal detector - bought following last year's spooky event when Evans and Mike were digging a hole in the ground for the satellite dish (I'm really not making this up): MIKE: Hey Evans, watch out for crucifixes when you're digging that hole. This used to be a monastery you know. EVANS (REACHING INTO THE HOLE) What, like this one? (HOLDS UP A THOUSAND YEAR OLD BRONZE CRUCIFIX FROM FIVE FEET DOWN).
- Spend all day in the TTI garden relaxing in one of the Institute's three hammocks, drinking wine, snoozing or reading one of the books from the TTI library.

- The Institute has a variety of board games, jigsaws, and similar entertainments together with a number of Victorian books with titles like ‘What To Do On Cold Winter Evenings Given That We Haven’t Invented Television Yet’.
- Debate physics with the help of the Institute blackboards.
- Listen to one of Mike’s tedious lectures inspired by the contents of the TTI Antiquarian Library such as *Richard Burton and the Source of the Nile* (Burton the Victorian explorer and polymath, not the one out of *Where Eagles Dare*..) or *Up The Orinoco with Alexander von Humboldt*.
- Spa treatments in the Bagni di Lucca ‘Thermal resort’.
- Mike is translating some chapters of a book on the history of Vallico Sotto. If he’s finished it by the time you visit, then walk around the village looking at the buildings and places it describes.
- MDT has taken to writing stories about events at the Institute and publishing them on his blog at the local Barga News website. See www.barganews.com and the “News from the Towler Institute” blog (or go to the TTI web site www.vallico.net/tti/tti.html and click on the relevant link in the left-hand column). So far these are mainly about cave explorations and similar adventures. However, Mike doesn’t have a monopoly on this. If you wish to contribute your literary efforts then please send your stories about your adventures in Italy to him, and they will be published on the blog.

9.5 General

- The Institute has a wildlife photography notice board. Prizes for the best entries, particularly if you can take a picture of one of the eagles that regular soar above Vallico or of the elusive *marmite*.
- The Towler Institute Exploration Society also has a photographic competition running - see the web site for details.
- Revitalize the economy of Vallico Sotto. It’s barely 40 years since 450 people lived here. Now less than 100 do so. Just because modern lazy teenagers want to be fashion models smoking drugs in Milan rather than having a nice healthy outdoor life, the population of rural Italy has been denuded. Let’s bring back the time when all the mountain terraces were in production, packs of nice mules helped carry things, teams of volunteers kept paths and bridges open, and everyone knew how to bake chestnut cakes. All serious suggestions gratefully received.

10 TTI TECHNICAL EQUIPMENT

There are various modern laptop computers in the Institute available both for general use and for CASINO practical sessions. Most dual boot into one of OpenSuse or Ubuntu Linux and one of Windows XP/Vista/7, but the practical sessions will be run under Linux. Though not really necessary you may bring your own laptop if you wish. It would help if you could set up a fortran (95) compiler on it before arriving at the school (we recommend Intel’s free ifort compiler - available for download on their website). Please be careful of the electrics when plugging in your own machine in order to avoid shorting out the projector etc. - in fact, it’s better to ask where to do so. Note that most of the available plug sockets in the lecture hall are of the *English* type, though some Italian ones are available.

All connections are made through a WiFi wireless network (802.11b or 802.11g). If you wish to bring your own laptop then it therefore needs to be wireless-enabled if you wish to log into the network (three spare wireless network cards that you can plug into your laptop PC card slot are available). The Institute SSID is ‘TTI’ and the network is completely unencrypted due to the total absence of hackers, or indeed computers, in remote mountain villages. Since June 2009, TTI is hooked up to the local 2 Mb/s wireless broadband network. If any particular laptop appears not to be connected to the network, then right click on the wireless icon in the bottom left-hand corner (OpenSuse Linux) or top-right (Ubuntu) and click on the ‘TTI connection’.

Apart from computers and networking devices, we also have the following equipment available for conference participants to use:

- A HP Laserjet black and white printer (on a wireless print server, so one can print from anywhere in the Institute) - the relevant print queue is called 'hp'.
- Canon Pixma ip4000 colour inkjet printer - at the back of the church directly connected to (usually) tti22.
- Sony photo printer for instant printing of your photographs (you can plug in your camera directly - no need to go through a laptop - accepts all memory card formats that I am aware of).
- Epson Perfection 4990 scanner
- A3 laminator
- Guillotine.
- Digital camera
- A HD video camera
- A small collection of USB memory sticks
- A supply of writeable CD-Rs, CD-RWs and DVD-Rs.
- The usual stationery and staples etc..

A technical guide to the TTI computer systems will be available. There is also an excellent selection of scientific reference books.

11 INTERNET USE

TTI laptops are mainly black/grey Sony Vaios with a few red Acer Ferraris (note the difference in power supplies - the ones for the Ferraris have yellow ends, the Sony machines have black ones). All but tti1 and tti20 are in dual boot configurations with some version of OpenSuse/Ubuntu Linux and Windows - after turning them on you should choose which OS you want. All will boot into Linux after some time by default unless you say otherwise. We essentially never use Windows here so the setup on the Windows partitions will be minimal if it has been done at all.

Since June 2009 the monastery's local network connects to the outside world through a 2Mb/s wireless broadband network (having previously been on dialup!). All local machines have static IP addresses 192.168.1.2x (where 2x is 20 plus the number of the machine - a red plastic label saying e.g. tti_laptop 9 implies 192.168.7.29) so they can all talk to each other via ssh or ftp etc.

Other network details for administrators: IP 192.168.1.xx (static xx=10-99, DHCP assigned numbers from xx=102-200), Gateway 192.168.1.1, Primary DNS 62.94.0.41, Secondary DNS 212.216.112.112.. The router has a (password protected) web page at 192.168.1.2. Other equipment attached to the network - a VoIP phone (192.168.1.98), an internet radio (192.168.1.99), a wireless print server (192.168.1.101), and possibly the NEC projector usually on DHCP. Do not assign your own static IP number on personal hardware without consulting MDT or PLR.

Please be mindful of the needs of other users of the network. Although we have broadband, it is hardly a superfast connection, and downloading 84 Gb of files to patch your Windows distribution or whatever is discouraged.

Note also that there is currently network coverage only in the main TTI building and not in any of the other houses we use for accommodation (Doctor's House, Casa Franca, Casa Gianpiero, Bedouin tent etc. Especially not the Bedouin Tent).

12 PRESENTATION EQUIPMENT

The church is equipped with a NEC MT1075 projector, a giant 16' by 12' main screen, a 7'8 x 5'9 electric auxiliary screen, an Avervision document camera, a dual projection stand, a laptop, a DVD player with decent speakers, and various wireless control devices. There is a giant blackboard in the church and a smaller one in the main corridor stolen from the TCM Seminar room in the Cavendish.

The projector is wireless capable, so presentations can be beamed from your laptop straight to it from anywhere in the room, as well as with old-fashioned direct connection (technical specs on the TTI website). The projector also allows PCMCIA card Mobile disks to be plugged into it. The Institute laptops will of course also take CDs and have the usual software such as Acroread and Powerpoint.

In the unlikely event of the NEC not functioning correctly with your laptop, or if you wish to project two images at once (e.g. one from a laptop, one from the document camera), there is also an auxiliary Toshiba DPD TDP-T250U projector.

The Institute has an Avervision document camera instead of an overhead projector. This will display any printed document, photo, slides, X-ray film or 3D object straight through the NEC projector, so basically you can dissect a frog live on the wall. There is a Victorian microscope with an attachment that allows it to be connected to the Avervision, so biological people can project the microworld onto the big screen. Although we have a table with a white square painted on it, non-electronic talks are probably better on white pieces of paper rather than on transparencies..

Speakers can of course ignore all the technology and use the blackboard.

13 DINNER

In general breakfast will be taken in the Institute, and lunch in the little bar in Vallico Sotto run by the charming Monica.

In the institute some basic food staples will be provided which participants should feel free to fight over but in general you might like to buy your own food in the village shop run by the lovely and friendly Adelina. However sadly you can't because it closed in late 2007 - much to the consternation of all she has now relocated to a big new shop down in the main valley in Pian di Coreglia. To replace her, there are two food shops in Fabbriche di Vallico - five minutes drive downhill, and a giant Leclerc supermarket in Gallicano (twenty-five minutes drive).

To find the Vallico Sotto bar for lunch, go down the tunnel underneath the Doctor's house (the big house opposite the TTI church front door). Then take any path downwards until you get to the Vallico main square - the bar is just underneath that.. You are strongly encouraged to take your lunch here, as normally it doesn't serve food and Monica is doing us a big favour by buying food and preparing it - so we need to make it worth her while . Note you can also get beers and coffees and so on here..

Note that people in local shops - or indeed anywhere round here - tend not to speak English, so learning some basic Italian food words before you come will help : *pane* = bread, *formaggio* = cheese, *prosciutto* = ham, *pomodori*=tomatoes, *birra* = beer, *vino* = wine, *caffè* = coffee, *latte* = milk, *grazie!* = thank you!.

You are of course welcome to make use of the Institute's cooking facilities whenever you want. There is a big downstairs kitchen in the main building, and a small upstairs kitchen. The Institute even has its very own *Il Collegio Cookbook* written and published by former owner Leonie Whitton whose recipes you are encouraged to try. There are also two kitchens in the adjacent Doctor's house which will be rented for the duration of the conference, and one in the Casa Franca/Luciana/Gianpiero/Sarda/Lontana houses.

On the first evening a simple buffet dinner will be provided. Later in the week the Institute's 16th Century pizza oven may be pressed into service. The rest of the time we will make use of the excellent local restaurants - these are mostly incredibly cheap. Unless told otherwise, Mike will simply assume that

you will be coming to each evening meal and will make bookings accordingly (generally a few weeks in advance). These bookings can be changed but please give Mike plenty of notice. The meals generally cost either 15 or 20 Euros each (irrespective of how much or what you eat).

Finally, if you are a vegetarian, you need to be aware that the locals will consider you to be certifiably insane and will feel very sorry that you are unable to enjoy their passion for delicious animal products of all kinds - particularly those made from parts of pigs. Don't worry about this. Following almost a decade of TTI activities, they are now used to us bringing strange foreigners to their restaurants and most are now able to supply vegetarian meals of some kind.

A FEW LOCAL RECOMMENDED LOCAL RESTAURANTS

- Il Molino Vecchio (3401557521 or 3471447248, Fabbriche di Vallico)
- Da Sandra (0583 761712 or 3403730040 on the road between Fabbriche di Vallico and Vallico Sotto).
- Il Canapale (0583 761829, Vallico Sopra)
- Al Laghetto (near the lake at the entrance to the Turrtecava valley)
- La Rondine (0583 761751 Fabbriche di Vallico, open Fri evening, plus all day Sat/Sun)
- Alto Matanna (0584 776005, Matanna)

RESTAURANTS SLIGHTLY FURTHER AFIELD

- Circolo dei Forestieri, Bagni di Lucca
- Antica Trattoria dell'Eremita, Vergemoli
- Il Garfagnino, on the main road near Turrtecava
- MANY MORE

SPECIAL RESTAURANTS

- La Buca di Sant'Antonio, Lucca
- La Mora, Ponte a Moriano
- Butterfly, Lucca

See also the TTI Restaurant Guide page on the website.

14 CINEMA VALLICO

The requirements of modern science presentations means the Institute church is also the only cinema in the whole of the Apuan Alps - a fact that local people very much enjoy (since the opening presentation of *Cinema Paradiso* in August 2005). During the conference you are welcome to use the projectors and it is expected that movies will be shown on several nights. The Institute has an extensive DVD library which you are welcome to browse. Feel free also to bring your own movies that you think we might enjoy.

15 NEWS FROM THE TOWLER INSTITUTE

MDT has taken to writing stories about events at the Institute and publishing them on his blog at the local Barga News website. See www.barganews.com and the "News from the Towler Institute" blog (or go to the TTI web site www.vallico.net/tti/tti.html and click on the relevant link in the left-hand column). So far these are mainly about cave explorations and similar adventures. However, Mike doesn't have a monopoly on this. If you wish to contribute your literary efforts then please send your stories about your adventures in Italy to him, and they will be published on the blog.

16 FOOTBALL MATCH: VALLICO SOTTO CONTRO IL MONDO

The thrusting young lads of Vallico Sotto have challenged the Rest of the World - i.e. you - to a game of 5-a-side football on the village pitch. This tradition - which we began last year - attracts a large crowd. Volunteers for the TTI team are below:

Salvatore Cardamone
Matthew Malcomson
Antonio Noto
Yury Gladush
Samuel Ridgway
Marcos Menendez

17 MUSIC

Participants with musical talents are encouraged to demonstrate them in the evenings. We have an acoustic guitar, a Line 6 Variax 500 electric guitar, a Line 6 guitar amplifier (with built-in effects), a top-of-the-range (for 1995, and still very good) Technics keyboard with a decent set of drum accompaniments and excellent piano sound, an electric violin, and 2 microphones. We also have an antique 17th-century violin (broken). There is a Yamaha Stagepas-300 PA system with built-in mixer into which anything electronic in need of amplification may be plugged. Note the Variax 500 is a *modelling guitar* (i.e. internal electronics process the sound from individual strings to supposedly model or replicate the sound of specific guitars and other instruments.)

On payment of a suitable fee (such as a cigarette, which he only smokes during TTI meetings because of the stress), Mr. Mike Towler can sometimes be persuaded to attempt poor-quality Jerry Lee Lewis impersonations on the piano, and Mr. Pablo López Ríos - who is actually a member of a proper band in Cambridge that plays in front of real people for money - is always happy to strum away in a variety of different styles. Mr. Neil Drummond is believed to be able to play the maracas, but we don't have any.

Note as with all musical performances, practice beforehand is always strongly recommended. Feel free to organize this.. (MDT knows various tunes that could do with some decent backing vocals.).

18 HEALTH AND SAFETY

We should all recognise that climbing, mountaineering and caving are activities with a danger of personal injury or death. Participants in these activities during their stay at TTI are asked to be aware of and accept these risks and be responsible for their own actions.

The nearest Accident and Emergency Department is 25 minutes away in Barga Hospital (car drivers should satisfy themselves as to its location on Google Maps) - other hospitals are in Lucca (50 minutes) and Castelnuovo di Garfagnana (45 minutes). The Italian emergency telephone number is 112.

Vallico Sotto is a mediaeval village built a thousand years ago on a steep slope with many steps, and naturally there no facilities whatsoever for the disabled; furthermore it seems that the builders of long ago have intentionally set traps designed to kill or injure you. However don't let this put you off; wheelchairs and so on can be manhandled up the hill with you in it if required - think of it as a challenge.

TTI is a smoking venue and visitors may smoke as much as they like (ashtrays will be provided).

19 FINALLY

Please address all queries to Mike Towler whose email address is `mdt26 at cam.ac.uk`.

HAVE FUN AT THE SUMMER SCHOOL!