

My secondment in UCSC

Venus Keus

University of Helsinki & Helsinki Institute of Physics



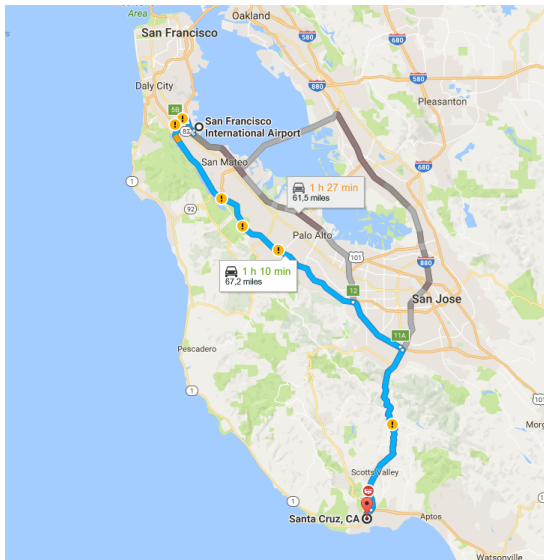
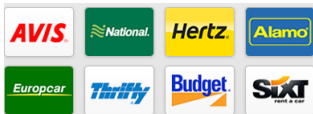
2nd RISE meeting
Uppsala, Sweden

7 Oct 2016

- 1 Practicalities: dates, flights, accommodation, transportation & research infrastructure
- 2 Knowledge transfer: what I gained and what I gave back
- 3 Research: with UCSC and other nodes while at UCSC
- 4 Summary & Comments

When/Where/How it all began

- **Dates:**
13th Jan - 13th Feb 2016
- **Flights:**
Helsinki ⇔ San Francisco
- **Transport at SFO:**
 - Public transport
 - Car rental facilities



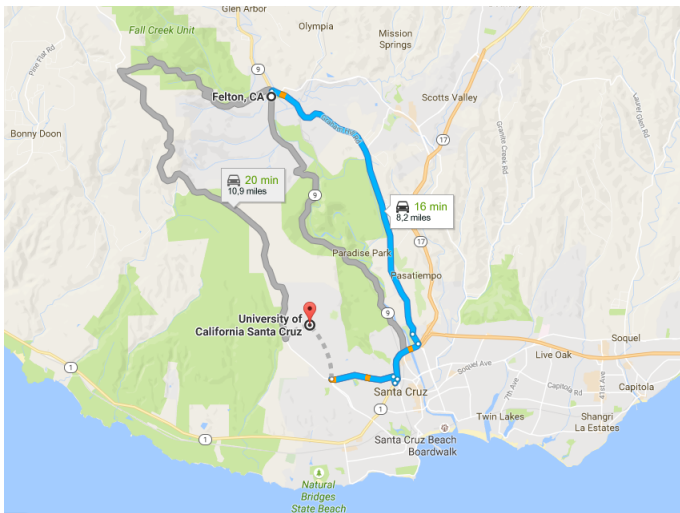
Accommodation

Help I received from UCSC for finding accommodation

- UCSC Faculty/Staff Housing: <http://housing.ucsc.edu/employee-housing/>
- UCSC Community Rentals: <http://housing.ucsc.edu>
- UCSC Sentinel Classifieds: <http://santacruzsentinel.ca.kaango.com>
- Sabbatical Homes: www.sabbaticalhomes.com
- Craigslist: <http://sfbay.craigslist.org/scz/>
- Airbnb <https://www.airbnb.com>

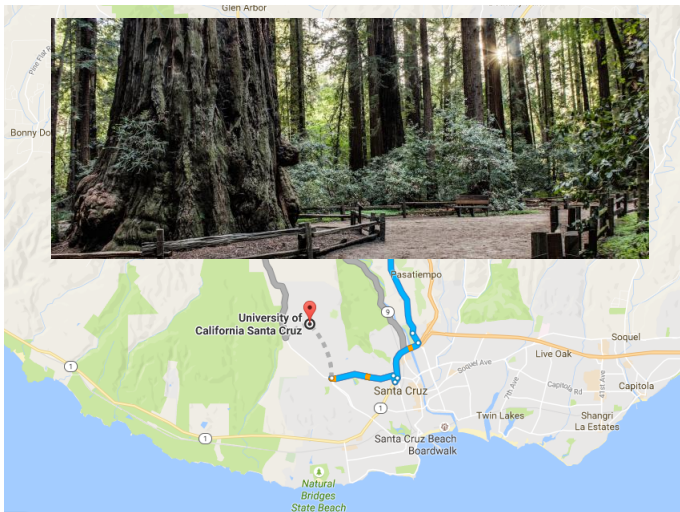
Santa Cruz and nearby towns

Santa Cruz, Paradise Park, Capitola, Scotts Valley, Felton



Where I ended up: Felton

Near the Henry Cowell Redwoods State Park



Transportation

- university campus bus
- my little rented car
- the healthy option



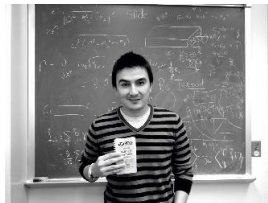
Research infrastructure

- office space and equipment
- computer, internet access
- access keys
- parking space
- OPERS facility access



ToK: what I gained

- Monday group meetings
- Tuesday Astroparticle group meetings
- Lunch discussions
- Scientific visitors
- Tuesday seminars at UCSC



SCIPP Seminars	
Today	Tuesday, 19 January 2016
Print Week Month Agenda	
Tuesday, 19 January 2016	
14:30	SCIPP Seminar: Anson Hook (Stanford)
Tuesday, 26 January 2016	
10:30	Special SCIPP Seminar with Dr. Anthony Affolder (University of Liverpool)
14:30	SCIPP Seminar: Simon Knapen (UC Berkeley and LBNL)
Tuesday, 2 February 2016	
10:30	Special SCIPP Seminar with Hongbo Zhu (IHEP Beijing)
14:30	SCIPP Seminar: Haichen Wang (LBNL)
Monday, 8 February 2016	
12:30	SCIPP Theory Group Meeting: 12:30-2:00pm
Tuesday, 9 February 2016	
14:30	SCIPP Seminar: Gilly Elor (MIT)
Friday, 12 February 2016	
12:30	Special SCIPP Seminar: Pierre Sokolsky (Univ. of Utah)
Tuesday, 16 February 2016	
14:30	SCIPP Seminar: Ennio Salvioni (UC Davis)

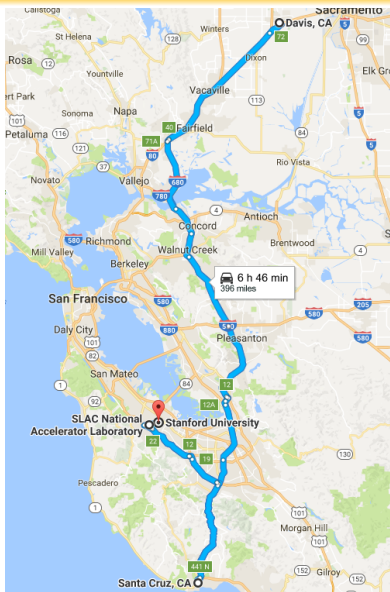
ToK: what I gave back

Seminars

- SLAC, Paolo Alto
- UC Davis, Davis
- SCIPP, Santa Cruz

Discussions

- Tuesday Astroparticle group meetings
- Informal student meetings



“Physics” bits

$$\begin{aligned}\mathcal{L} = & -\frac{1}{4} F_{\mu\nu} F^{\mu\nu} \\ & + i \bar{\Psi} \not{D} \Psi + h.c. \\ & + \bar{\Psi}_i \gamma_{ij} \Psi_j \phi + h.c. \\ & + |D_\mu \phi|^2 - V(\phi)\end{aligned}$$

Research with UCSC members

- “CP violating observables in purely bosonic theories”,
H. Haber, V. Keus, T. Stefaniak, S. Thomas, [in final stages]
- “The minimal model for ElectroWeak Baryogenesis”,
V. Keus, E. Miller, S. Profumo, T. Stefaniak, [in preparation]
- “Loop level vacuum stability in 2HDMs”,
K. Dolev, P. Ferreira, V. Keus, S. Profumo, T. Stefaniak, [in preparation]
- “CP-violation in singlet-doublet models”
F. D’Eramo, V. Keus, [in early stages]

Research with other RISE nodes while at UCSC

- “CP Violating Two-Higgs-Doublet Model: Constraints and LHC Predictions”,
V. Keus, S. F. King, S. Moretti, K. Yagyu, [JHEP **1604**, 048 (2016)]
- “Higgs-flavon mixing and $h \rightarrow \mu\tau$ ”,
K. Huitu, V. Keus, N. Koivunen, O. Lebedev, [JHEP **1605**, 026 (2016)]
- “CP violating scalar Dark Matter”,
A. Cordero-Cid, J. Hernandez-Sanchez, V. Keus, S. F. King, S. Moretti, D. Rojas, D. Sokolowska, [arXiv:1608.01673 [hep-ph]]
- “Loop induced cascade decays”,
A. Cordero-Cid, J. Hernandez-Sanchez, V. Keus, S. F. King, S. Moretti, D. Rojas, D. Sokolowska, [in final stages]

Research with other RISE nodes while at UCSC

- “Dark CP violation at the LHC” ,
A. Cordero-Cid, J. Hernandez-Sanchez, V. Keus, S. F. King,
S. Moretti, D. Rojas, D. Sokolowska, [in final stages]
- “Flavon induced flavour violation at the LHC” ,
K. Huitu, V. Keus, N. Koivunen, O. Lebedev, [in preparation]
- “ μ -type spectral distortions in the CMB” ,
K. Enqvist, V. Keus, [in preparation]
- “Electric Dipole Moment bounds on CP-violation in extended Higgs sectors” ,
V. Keus, K. Tuominen, [in preparation]

Impact

- Broadened my network
- Gave me a chance to work in a non-EU research environment
- Opened up new career opportunities
- Helped me start new collaborations and new friends



Summary & comment

- It was a fantastic opportunity for which I am very grateful
- The time of the secondment was rather short
→ another reason for workshops such as this one
- More info about the secondments on the webpage:
<http://theory.physics.helsinki.fi/risehiggs>