

WORKSHOP IN COMPUTABILITY THEORY
PROGRAM & USEFUL INFORMATION
THE UNIVERSITY OF SAN FRANCISCO, MARCH 22–23, 2011

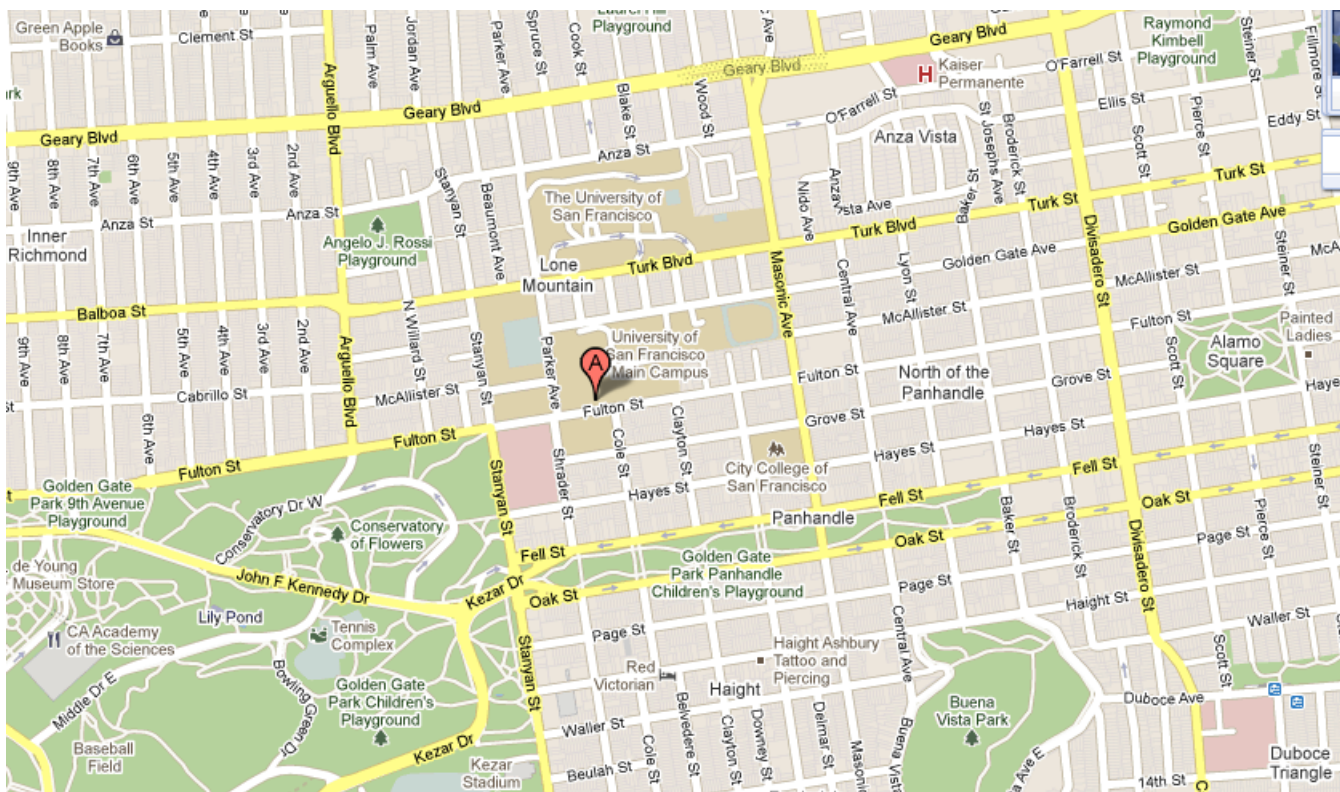
TRANSPORTATION

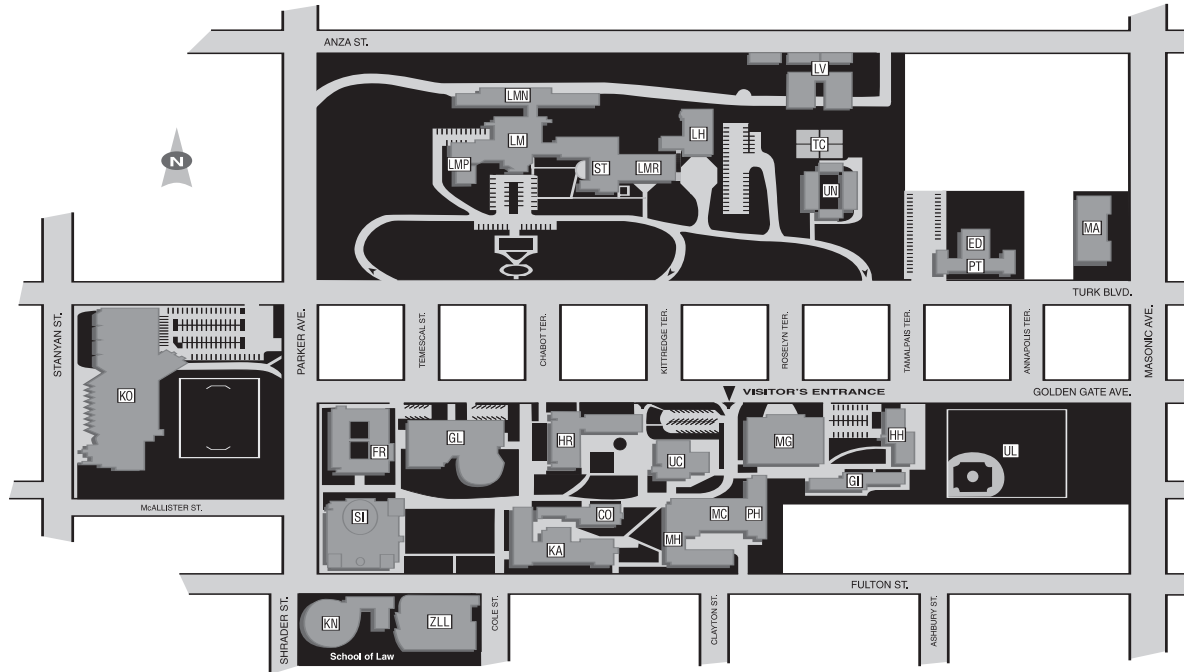
USF is serviced by the **5 Fulton**, **21 Hayes**, **31 Balboa**, **43 Masonic**, and **33 Stanyan** bus lines. The **38 Geary** also passes near campus. Bus fare is \$2 and **exact change** (bills or coins) is required. Paper transfers are valid for riding on any bus until the time shown at the bottom the transfer.

Google Maps (maps.google.com) has an excellent **trip planner** for Bay Area public transit. (Get directions, and then click on the bus icon.)

Taxis are inexpensive, but often difficult to find. Even when calling a taxi there may be a long wait (30 minutes or more). Luxor Cab (415) 282-4141 and Yellow Cab (415) 333-3333 are two of the local cab dispatches.

MAP OF USF AREA & CAMPUS





Main Campus

CO	Cowell Hall
FR	Fromm Hall
GI	Gillson Hall
GL	Gleeson Library
HH	Hayes-Healy Hall
HR	Harney Science Center
KA	Kalmanovitz Hall
MC	McLaren Conference Center
MG	Memorial Gymnasium
MH	Malloy Hall
PH	Phelan Hall
SI	Saint Ignatius Church
UL	Ulrich Field & Benedetti Diamond
UC	University Center

Lone Mountain Campus

LH	Loyola House
LM	Main Bldg/Classrooms/Study Hall
LMN	Lone Mountain North
LMP	Pacific Wing
LMR	Rossi Wing/Administration
LV	Loyola Village
ST	Studio Theater
TC	Tennis Courts
UN	Underhill Building ROTC/Upward Bound

School of Law

KN	Kendrick Hall
ZLL	Dorraine Zief Law Library

Koret Health & Recreation Center

KO	Koret Center
----	--------------

School of Education

ED	School of Education
PT	USF Presentation Theater

281 Masonic

MA	281 Masonic
----	-------------

Office Locations

Academic and Enrollment Services
Lone Mountain Main

Academic Support Services
Gleeson Lower Level, 20

Admission Office
Lone Mountain Main

Alumni Office
Lone Mountain Rossi Wing, 112

Arts and Sciences, College of
Harney, 240

Athletics
Memorial Gym, Lower Level

Bookstore
University Center, Lower Level

Business and Professional Studies, School of
Malloy Hall, 244

Career Services Center
University Center, 429

Counseling Center
Gillson, Ground Floor

Education, School of
Turk at Tamalpais, 107

Financial Aid
Lone Mountain Main

Information Technology Services
Lone Mountain North, 2nd Floor

International Student Services
University Center, 402

Koret Health and Recreation Center
Corner of Parker and Stanyan

Law Library, Dorraine Zief
Corner of Fulton and Cole

Law, School of
Corner of Fulton and Shrader

Loyola House/Jesuit Community
Lone Mountain, 2600 Turk Street

Multicultural Student Services
University Center, 405

One Card
Lone Mountain Main, 130

One Stop Enrollment and Financial Services
Lone Mountain Main, 250

Nursing, School of
Cowell, 102

Public Safety
University Center, 310

Registrar's Office
Lone Mountain Main, 250

Residence Life
Phelan, 140

Student Disability Services
Gleeson Lower Level, 20

SESSION LOCATIONS

Please note that talks will be held in different rooms:

- On **Tuesday, March 22**, all talks will be in the **Maraschi Room in Fromm Hall**, located in the northeast corner of the lower (main) campus near the intersection of Parker Ave. & Golden Gate Ave.
- **Morning talks on Wednesday, March 23**, will be held in **Room 250 of the McLaren Conference Center** on the south side of the lower (main) campus near the intersection of Fulton St. & Clayton St.
- **Afternoon talks on Wednesday, March 23**, will be held in **Room 232 of the Harney Science Center** on the north side of the lower (main) campus, near the intersection of Golden Gate Ave. & Chabot Ter.

ACCESSING THE INTERNET ON CAMPUS

- (1) Log on to USFWireless
- (2) Enter Username: WCTGuest
- (3) Use Password: 123456

AREA RESTAURANTS

Near campus.

- Twilight Cafe at Stanyan & McAllister serves Middle Eastern/Mediterranean food. Inexpensive, a pretty small place.
- Velo Rouge Cafe at McAllister & Arguello serves very good sandwiches, soups, and salads. Inexpensive, tiny and often crowded.
- Okina Sushi on Arguello near McAllister (776 Arguello). Sushi.
- Bistro Gambrinus on Fulton near Masonic (1813 Fulton). Pub-style food (burgers & beer).
- Starbucks at Fulton & Masonic
- Papalote II Mexican Grill on Fulton near Masonic (across from Lucky). Burritos, etc. This is a small place.
- Jannah on Fulton near Masonic (across from Lucky). Middle Eastern. Not small.
- Abacus on Hayes between Cole and Clayton. Chinese.
- Green Chili Kitchen at McAllister and Baker. Burritos, etc. Not small.
- On Haight Street (10 minute walk south of USF) there are lots restaurants.
- On Geary and Clement Streets (15 minute walk northwest of USF) there are lots of restaurants, primarily Chinese, Vietnamese, and Burmese, but plenty of other cuisines are to be found as well.

On campus.

- The Market Cafe on the second floor of the University Center is a pretty decent and food-court style.
- Outtakes Cafe on the ground floor of Lone Mountain (up the big hill).
- Crossroads Cafe on the first floor if the University Center offers some food and coffee/espresso.

TUESDAY, MARCH 22, 2011, **Fromm Hall, Maraschi Room**

10:00–10:45	Julia Knight	Effectiveness in real closed fields: Computable model theory becomes more interesting when it combines sophisticated ideas from computability and modern model theory. At the ASL Meeting in Florida in 2007, Salma Kuhlmann gave a talk that I found extremely interesting, on integer parts for real closed fields. With some collaborators, Paola D'Aquino, Sergei Starchenko, Karen Lange, and Salma Kuhlmann, I have looked at some natural questions related to these objects. I will summarize the results so far.
11:00–11:45	Reed Solomon	The complexity of central series terms in nilpotent computable groups: For a nilpotent computable group, each of the terms in the lower and upper central series has computably enumerable Turing degree. We show that the degrees of these terms can be independent even when the group is torsion free and admits a computable order. This work is joint with Barbara Csima.
Noon–2:00pm	Lunch Break	
2:00–2:45	Alexandra Soskova	Degree spectra and conservative extensions of abstract structures: The degree spectrum of an abstract structure is a measure of its complexity. We consider a relation between abstract structures \mathfrak{A} and \mathfrak{B} , possibly with different signatures and $ \mathfrak{A} \subseteq \mathfrak{B} $, called conservative extension. We give a characterization of this relation in terms of definability by computable Σ_n formulae on these structures. We show that this relation provides a finer complexity measure than the one given by degree spectra. As an application, we receive that the n -th jump of a structure and its Marker's extension are conservative extensions of the original structure. We present a jump inversion theorem for abstract structures. We prove that for every n and k and each complex enough structure \mathfrak{A} , there is a structure \mathfrak{B} , such that the definable by computable Σ_n formulae sets on \mathfrak{A} are exactly the definable by computable Σ_k formulae on \mathfrak{B} . This is joint work with Ivan Soskov and Stefan Vatev.
3:00–3:45	Rebecca Steiner	Effective Algebraicity: In 2009, R. Miller proved several results about computable algebraic fields and computable categoricity. Also in 2009, A. Frolov, I. Kalimullin, and R. Miller proved some results about the degree spectrum of a computable algebraic field when viewed as a subfield of its algebraic closure. Here, we show that the same computable categoricity results also hold for computable finite-branching trees under the predecessor function and computable, connected, finite-valence graphs, and we show that the degree spectrum results do not hold for these trees and graphs. We also offer an explanation for why the degree spectrum results distinguish these classes of structures.
4:00–4:45	Doug Cenzer	Structures and Isomorphisms in the Difference Hierarchy: The notions of computable and relative computable categoricity can be considered for structures and isomorphisms which are not too far from being computable. In particular, I will talk about structures which are definable in the Ershov difference hierarchy and about isomorphisms ranging from computable up to Δ_3^0 . Structures considered include Abelian groups, equivalence structures and injection structures.

WEDNESDAY, MARCH 23, 2011

Morning Session: McLaren Conference Center, Room 250.

10:00–10:45	Björn Kjos-Hanssen	Recovering randomness from an asymptotic Hamming distance: A notion of asymptotic Hamming distance suitable for the study of algorithmic randomness of infinite binary sequences is developed. As an application, it is shown that there is no fixed procedure that computes sequences with certain stochastic bi-immunity properties from a complex sequence. Here a sequence is complex if its prefixes have Kolmogorov complexity bounded below by an unbounded, nondecreasing computable function.
11:00–11:45	Noam Greenberg	Cupping and jump classes in the c.e. degrees: A c.e. degree \mathbf{a} is <i>cuppable</i> if there is an incomplete c.e. degree \mathbf{b} such that $\mathbf{a} \vee \mathbf{b} = \mathbf{0}'$. To understand the interplay between the partial ordering of the c.e. degrees and the effect of the jump operator, a fundamental question is: if \mathbf{a} is cuppable, in what jump classes do the cupping partners of \mathbf{a} reside? For example, a classic theorem by Ambos-Spies, Jockusch, Shore and Soare identifies the low-cuppable c.e. degrees as those that contain a promptly simple set. We discuss a couple of recent results in this area.
Noon–2:00pm	Lunch Break	

Afternoon Session: Harney Science Center, Room 232

2:00–2:45	Ted Slaman	Random Reals, the Rainbow Ramsey Theorem, and Arithmetic Conservation: In joint work with Chris Conidis, we investigate the question “To what extent can random reals be used as a tool to establish number theoretic facts?” Let $2 - RAN$ be the principle that for every real X there is a real R which is 2-random relative to X . By arguments of Csima and Mileti, $RCA_0 + 2 - RAN$ implies the Rainbow Ramsey Theorem for Pairs, a variation on the usual Ramsey Theorem. We show that the Rainbow Ramsey Theorem is not conservative over RCA_0 for arithmetic sentences. Thus, the existence of random reals has non-trivial infinitary-combinatorial consequences and also non-trivial arithmetic consequences. Then, we show that $2 - RAN$ is conservative over $RCA_0 + B\Sigma_2$ for Π_1^1 -sentences. Thus, the set of first-order consequences of $2 - RAN$ is strictly stronger than $P^- + I\Sigma_1$ and no stronger than $P^- + B\Sigma_2$.
3:00–3:45	Wesley Calvert	Specifying Computation for a Complicated World: Often, things we’d like to compute are just too enormous, too noisy, or not well-enough known. A natural scientific approach, well-known since at least Ulam and von Neumann, is to simply compute on a sample and accept a level of uncertainty in the result. Randomized computation is a theoretical model of this approach. It is frequently faster than deterministic computation, allows (in a sense we will discuss) uncertain inputs, and gives an effectiveness theory with the strength of ACA_0 . The present talk will present this model of computation, along with its relationship with continuous first-order logic and some applications.
4:00–4:45	Barry Cooper	The “Mathematician’s Bias”, and the Return to Embodied Computation: In the ACM Ubiquity Symposium on “What Is Computation”, Dennis Frailey (see http://ubiquity.acm.org/article.cfm?id=1891341) refers to the “mathematician’s bias” (being an emphasis on the computability of functions rather than processes) - which “limits our thinking and prevents us from fully appreciating the power of computation ... Today, I believe we are breaking out of the era where only algorithmic processes are included in the term computation.” In this talk we explore the theme of the mathematician’s bias, and some available routes to widening its scope.