Double agent : Michal Tal
Profile : Academic spy
Cover : Fluvial geomorphologist
Code name : Alfalfa

BA, Geography, Hebrew University of Jerusalem, Israel (i.e. Mossad)
PhD, Geology and Civil Engineering, St. Anthony Falls Laboratory, Univ. of Minnesota, U.S.A
Postdoc, Institut du Physique du Globe de Paris, France
Assistant Prof, Physical Geography and Geology, CEREGE, Univ. of Aix-Marseille, France

Moi : Research interests

i. Quantifying interactions between life and its landscape

ii. Understanding how human interventions affect landscape dynamics

I. Scientific research and river management

II. Communicating science

III. Academic training in France and the United States

Research
noun
the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions

Management
noun
the process of dealing with or controlling things or people

“If we knew what it was we were doing, it would not be called research, would it?”
- Albert Einstein, 1879 – 1955, physicist

“Management means, in the last analysis, the substitution of thought for brawn and muscle, of knowledge for folklore and superstition, and of cooperation for force”
- Peter F. Drucker, 1909 – 2005, writer and management consultant

“Inquiry is fatal to certainty”
- Will Durant, 1885 – 1981, writer, historian, philosopher

“Research is creating new knowledge”
- Neil Armstrong, astronaut

“The trouble with research is that it tells you what people were thinking about yesterday, not tomorrow. It's like driving a car using a rearview mirror”
- Bernard Loomis, 1923 – 2006, toy developer and marketer

“Money won't buy happiness, but it will pay the salaries of a large research staff to study the problem”
- Bill Vaughan, 1915 – 1977, columnist and author

“Risk comes from not knowing what you’re doing”
- Warren Buffett, investment entrepreneur

“Fools make researches and wise men exploit them”
- H.G. Wells, 1866 – 1946, science-fiction author

“Our investigations have always contributed more to our amusement than they have to knowledge”
- Will Rogers, 1879 – 1935, cowboy, humorist, actor

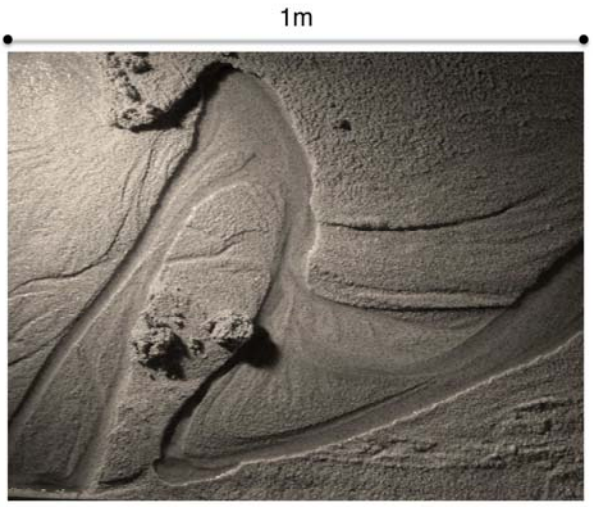
“However beautiful the strategy, you should occasionally look at the results”
- Sir Winston Churchill, 1874-1965, English statesman

Moi : Research projects

Interactions between braiding and vegetation leading to the formation of single-thread channels

Transport dynamics of woody debris in an experimental braidplain

Experimental meandering



Characterising the grainsize distribution and long-profile of the Rhone River

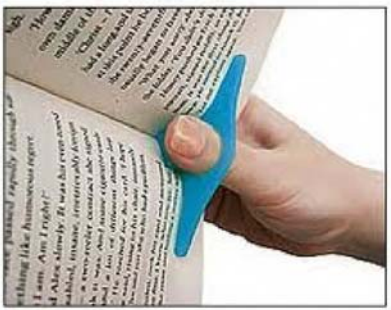
(Go see Elsa Parrot's poster tomorrow!)

Reduction in riverine silica transport due to changes in riparian vegetation, Platte River, Nebraska

Hydro-sedimentary dynamics and bio-diversity in the casiers Girardon, Rhone River, Arles

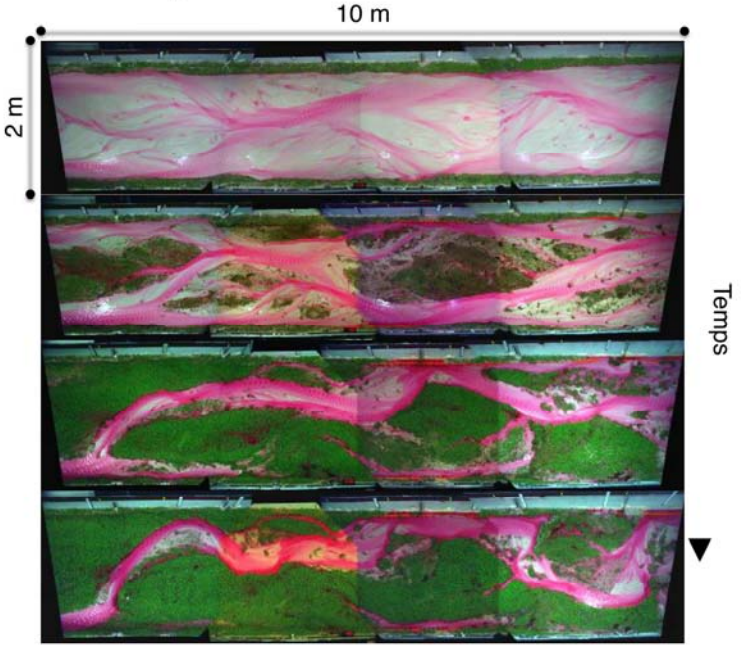
Moi : in summary…

Loves thinking about really imortant problems, but struggles with process of getting those ideas out there and putting them to good use…



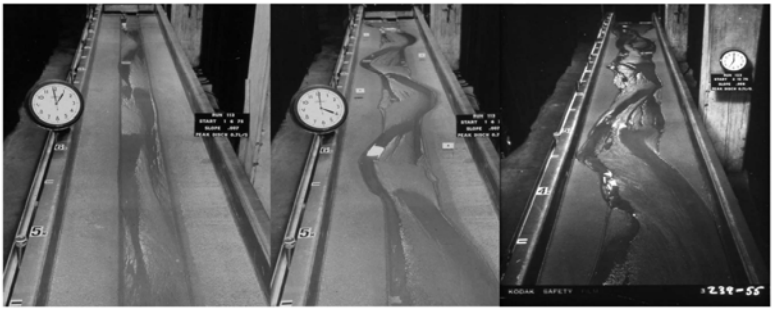
A research project case study

How do plants and river channels self organize?



Tal & Paola, *Geology*, 2007
Tal & Paola, *ESPL*, 2010

Influence de la végétation sur les rivières alluviales



What is the role of bank stability in the development of meanders?

What controls the bankfull channel geometry?

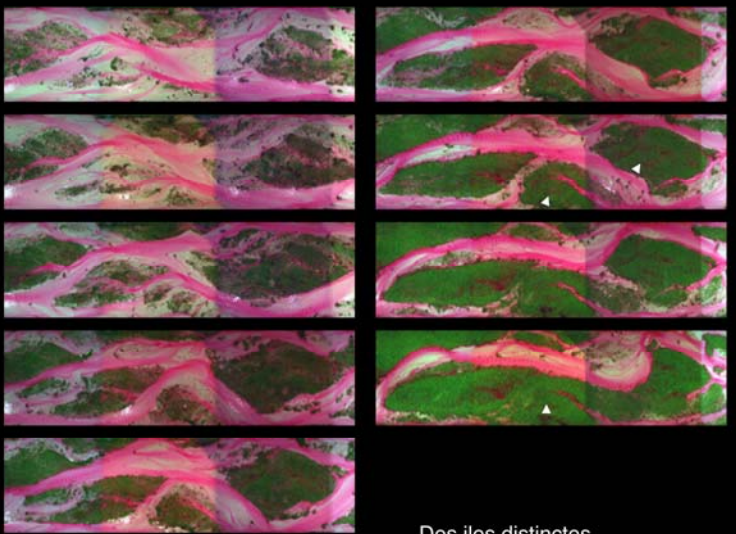
How do floodplains develop?

??

Formation d'une plaine d'inondation :
un processus d'agrégation conduit par la végétation

Exp. 03, crues :
3,5,7,9,11,13,15,17,19

8.1 m

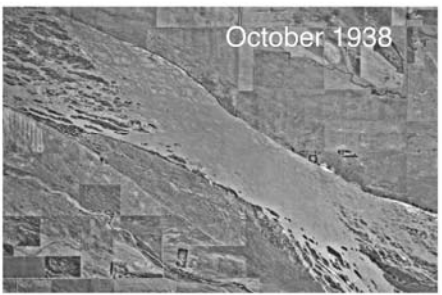


Des iles distinctes
se connectent

Motivation : vegetation encroachment in response to hydrological modifications

Modification de l'hydrologie et de l'apport en sédiments → Invasion par la végétation → Changement de la morphologie du chenal

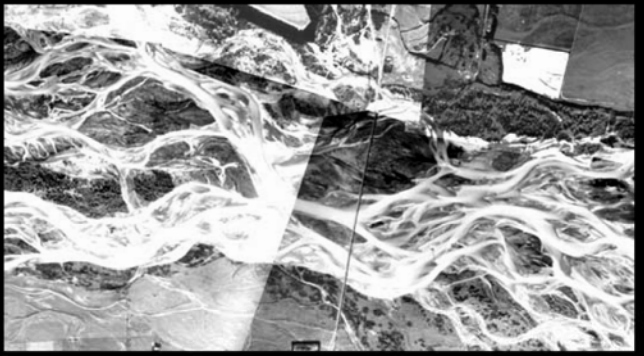
Platte, Nebraska, Etats-Unis



- Habitat degradation
- Increased risk of flooding

What will be the impact of vegetation encroachment on channel morphology and how long will this transition take?

1936



Lower Waitaki River,

South Island, New Zealand

2001

Hicks, D.M. et al. (2002)

How can management practices prevent, slow down, or reverse vegetation encroachment? – flush flows, timing…etc

devegetation on the Platte R. Nebraska

Images courtesy of Tim Randle, USBR and Environment Canterbury, NZ

spraying on the Wairau R., NZ

How will invasive plants impact channel – plant interactions?

Timescales of vegetation-channel interactions as a key parameter controlling channel morphology

space/time characteristics of seed dispersal and plant growth

occupation, abandonment, and reworking of the bed by flowing water

biologique / physique

$T_* = T_{veg} / T_{channel}$

$T_* > 1$ ⟶ tresses

$T_* < 1$ ⟶ méandre

$T_{channel}$

T_{veg}

Paola, 2000; Tal, PhD, 2008 ; Hicks et al., 2008

Timescales of vegetation-channel interactions

$T_* = T_{veg} / T_{channel}$

$T_{veg} = 5$ years

$T_{channel}$

	b active braidplain width (m)	*e* rate of riverbed erosion	T_*
Waitaki R.	1400	81 m/yr	0.29

Hicks et al., GBR VI, 2008

Timescales of vegetation-channel interactions

$T_* = T_{veg} / T_{channel}$

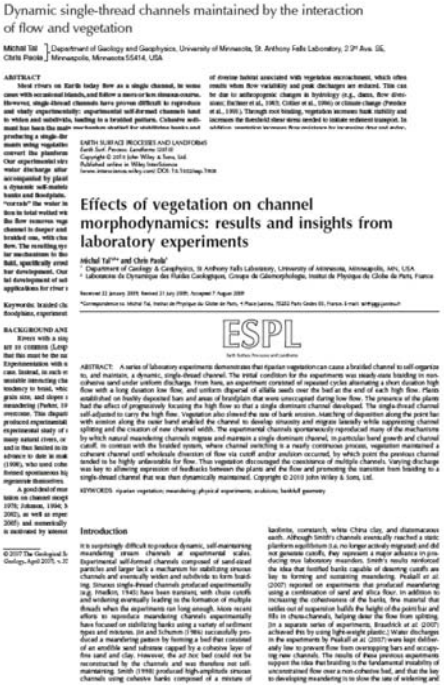
$T_{veg} = 5$ years

$T_{channel}$

	b active braidplain width (m)	*e* rate of riverbed erosion	*T*.
Waitaki R.	1400	81 m/yr	0.29
Waimakariri R.	1000	600 m/yr	3
		300 m/yr	1.5
		Lane et al, 2003	

Hicks et al., GBR VI, 2008

Results : successes



Dynamic single-thread channels maintained by the interaction of flow and vegetation

Michal Tal, Chris Paola — Department of Geology and Geophysics, University of Minnesota, St. Anthony Falls Laboratory, 2 3rd Ave. SE, Minneapolis, Minnesota 55414, USA

ABSTRACT

EARTH SURFACE PROCESSES AND LANDFORMS

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Published online in Wiley InterScience

Effects of vegetation on channel morphodynamics: results and insights from laboratory experiments

Michal Tal and Chris Paola

Department of Geology & Geophysics, St Anthony Falls Laboratory, University of Minnesota, Minneapolis, MN, USA

Laboratoire de Dynamique des Fluides Géologiques, Groupe de Géomorphologie, Institut de Physique du Globe de Paris, France

ESPL

ABSTRACT: A series of laboratory experiments demonstrates that riparian vegetation can cause a braided channel to self-organize to, and maintain, a dynamic, single-thread channel. The initial condition for the experiments was steady-state braiding in non-cohesive sand under uniform discharge. From here, an experiment consisted of repeated cycles alternating a short duration high flow with a long duration low flow, and uniform dispersal of alfalfa seeds over the bed at the end of each high flow. Plants established on freshly deposited bars and areas of braidplain that were unoccupied during low flow. The presence of the plants had the effect of progressively focusing the high flow so that a single dominant channel developed. The single-thread channel self-adjusted to carry the high flow. Vegetation also slowed the rate of bank erosion. Matching of deposition along the point bar with erosion along the outer bend enabled the channel to develop sinuosity and migrate laterally while suppressing channel splitting and the creation of new channel width. The experimental channels spontaneously reproduced many of the mechanisms by which natural meandering channels migrate and maintain a single dominant channel, in particular bend growth and channel cutoff. In contrast with the braided system, where channel switching is a nearly continuous process, vegetation maintained a coherent channel until wholesale diversion of flow via cutoff and/or avulsion occurred, by which point the previous channel tended to be highly unfavorable for flow. Thus vegetation discouraged the coexistence of multiple channels. Varying discharge was key to allowing expression of feedbacks between the plants and the flow and promoting the transition from braiding to a single-thread channel that was then dynamically maintained. Copyright © 2010 John Wiley & Sons, Ltd.

KEYWORDS: riparian vegetation; meandering; physical experiments; avulsions; bankfull geometry

Introduction

+

Broad interdisciplinary interest

Worldwide interest in alfalfa…

Question about fungi problem in flume experiment with alfalfa — colleauges_saved

From: **Wang Chen**
Subject: Question about fungi problem in flume experiment with alfalfa
Date: 4 juin 2012 15:55:17 HAEC
To: tal@ipgp.jussieu.fr <tal@ipgp.fr>

Hide

1 Attachment, 271 KB Save Quick Look

Dear Dr. Michal Tal,
I am a PhD student at the University of Antwerp. We are doing some similar experiments as yours in the flume with alfalfa. We have a problem of fungi. we seeded alfalfa every two days in the flume and flooded the flume every few days. The water for flooding is recycled after filtering the seeds and plants that were washed out. At the beginning, the alfalfa can germinate and grow well. However, after a few weeks, fungi started to develop, alfalfa started to die, and no new alfalfa could germinate or grow. Since our experiments are run in a closed lab with high humidity and no natural light, fungi could easily develop, especially considering the availability of tiny dead plant material in the recycled water. Did you have such kind of problem in your experiments? How did you solved it, please? Thank you very much. Looking forwards to your reply.
Best wishes,
Chen

Chen Wang, PhD student
University of Antwerp - Campus Drie Eiken
Department of Biology
Ecosystem Management Research Group
Universiteitsplein 1, C 2.23
BE - 2610 Antwerpen (Wilrijk)
tel: +32 (0)3 265 2262
fax: +32 (0)3 265 2271
e-mail: chen.wang@student.ua.ac.be
www.ua.ac.be/ecobe

Results : shortcomings

- Limited diffusion of results to river managers
- Limited diffusion of results to the general public
- Did not result in a concrete set of guidelines and tools

Message :

Taking research to the next step is hard work despite excellent intentions!

1. Requires thinking about a lot of real-world complications that we would often rather not think about…
2. Going to meetings and forging collaborations with people and institutes outside of our natural circle
    1. Lack of time
    2. Not always rewarded by academic institutions
    3. Rewarded differently across disciplines (Eng, geog, earth sciences)

Some things to keep in mind :

1. River managers are not less smart
2. Researchers are not smarter
3. River managers are often working on specific problems and have specific questions
4. Researchers have lots of problems, too many questions, and not enough answers
5. River managers want the scientific insight in a useable form
6. Researchers need managers to inform them about the problems in the real world

Bottom line :
DO WHAT YOU DO WELL!

II. If you're going to talk the talk, you've got to walk the walk….

A quick tour of all the great things going on
and a call to action…

National Center for Earth-surface Dynamics

A National Science Foundation Science and Technology Center

How will our ecosystems respond to a changing climate? More...

How will the coupled system of physical, biological, geochemical, and human processes that shape the surface of the Earth respond to changes in climate, land use, environmental management, and other forcings?

The National Center for Earth-surface Dynamics, an NSF Science and Technology Center, is a partnership of research and educational institutions, government agencies, and industry that pursues its goal of predictive Earth-surface science by integrating physical, biological, and social sciences to understand how landscapes and ecosystems evolve together.

The Center was developed to build our predictive ability, and therefore our scientific understanding, of the near-surface Earth environment.

NCED for You

» Tools and Data
» For Students
» For Educators
» For Institutions/NGOs
» For Researchers
» For Policy Makers
» For Practitioners
» For Public
» For Members

NCED Notes

» Cool collaboratory! http://t.co/ZdISQTxH 2 days ago

» Lots of tweets out there sharing photos from #floods in #Duluth, Minnesota http://t.co/Ebx8zl6G 2 days

NATIONAL CENTER FOR EARTH-SURFACE DYNAMICS

A NATIONAL SCIENCE FOUNDATION SCIENCE & TECHNOLOGY CENTER

NCED Stream Restoration Toolbox

Appropriate Use of Bank Stabilization For River Rehabilitation

By: J. Wesley Lauer

March 23, 2006

Ripple: A Coho Salmon Population Model

Ripple is a digital terrain-based model for defining the limiting factors in coho salmon populations in upland watersheds. Ripple is the result of a long-term collaboration with Stillwater Sciences (an NCED partner). As a first step in applying our terrain-based approach to a specific population, Ripple uses topographic data to calculate habitat and a population dynamics model to identify habitat limitations.

It is specifically designed:

1. To be used where data are limited;
2. To serve as a guide to field investigations;
3. To guide management decisions; and
4. To refine hypotheses for further theoretical advances.

Requirements

Ripple only works under ESRI's ArcGIS Desktop. You must have an operating copy of either ArcGIS 8.3 or 9.2 to run Ripple. There are separate project files for each version. OS: Windows XP or Vista

Peter R. Wilcock
Professor & Associate Chair
Dept Geography & Environmental Engineering
Johns Hopkins University
Baltimore MD 21218
wilcock@jhu.edu
(410) 516-5421 Office
(410) 516-8996 Fax

Links to Papers

Links

Useful Materials

Research Interests

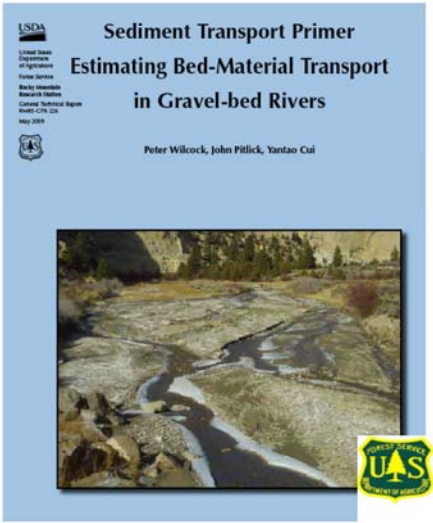
Erosion and sedimentation
River sedimentation processes and their role in stream restoration and river management
Laboratory and field experiments in sediment transport, open-channel flow, fluvial geomorphology

Peter Wilcock's Home Page

Short Course Lecture Notes - These are somewhat informal and ever-changing lecture notes that support various short course presentations on restoration.

0. Hydraulics & Modeling Water Surface Profiles (pdf 171KB)
1. Sediment Transport Introduction (pdf 180KB)
2. The Flow Problem (pdf 258KB)
3. The Sediment Problem (pdf 121KB)
4. Estimating Transport Rates (pdf 153KB)
5. Sediment Transport in Stream Restoration (pdf 200KB)

on hydraulics, sediment transport, and stream



STREAM SYSTEMS TECHNOLOGY CENTER

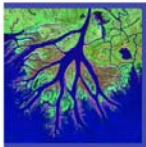
User Agreement

About the software

BAGS: Bedload Assessment in Gravel-bedded Streams

Click here to apply bedload transport equations

Refresh worksheet

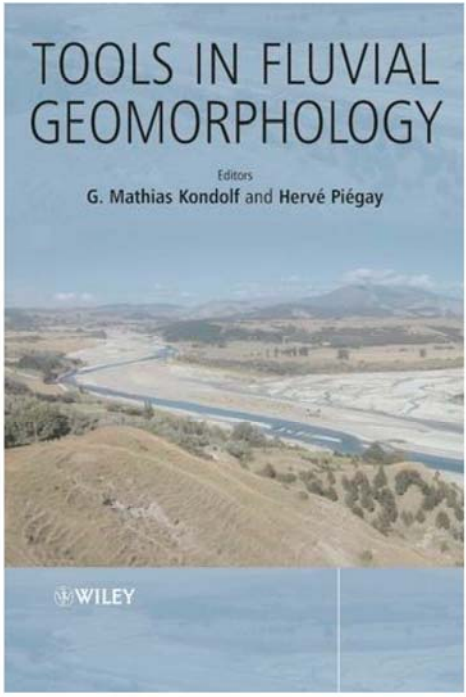


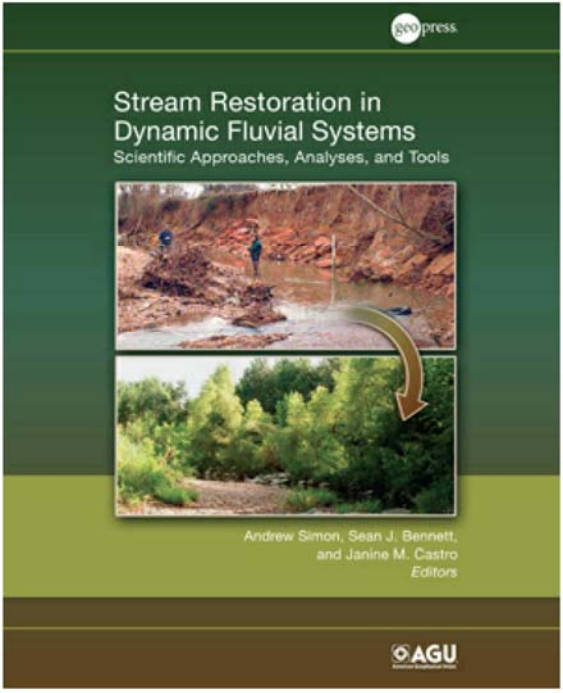
ID SEDIMENT TRANSPORT MORPHODYNAMICS
with applications to
RIVERS AND TURBIDITY CURRENTS

An e-book by
Gary Parker
Department of Civil and Environmental Engineering and Department of Geology
University of Illinois
Ven Te Chow Hydrosystems Laboratory, 245 Mathews, Urbana IL 61801 USA

Nile Delta, Egypt
NASA Image from Internet

Copper Creek Fan, Death Valley, USA
Image courtesy Roger Hooke


TOOLS IN FLUVIAL GEOMORPHOLOGY
Editors
G. Mathias Kondolf and Hervé Piégay
WILEY


geopress
Stream Restoration in Dynamic Fluvial Systems
Scientific Approaches, Analyses, and Tools
Andrew Simon, Sean J. Bennett, and Janine M. Castro
Editors
AGU

Sagehen Courses...

GEOMORPHIC AND ECOLOGICAL FUNDAMENTALS FOR RIVER AND STREAM RESTORATION

Codornices Creek *Cold Creek* *Redwood Creek*

Stream Restoration

GEOMORPHIC AND ECOLOGICAL FUNDAMENTALS FOR RIVER AND STREAM RESTORATION

August 13-17, 2012

ICRRR

Intermountain Center for River Rehabilitation and Restoration

Stream Restoration Courses

- At ICRRR, we teach stream restoration courses and workshops to help participants expand their skillsets in restoration design, monitoring and planning.
- We offer both hands on workshops on very specific techniques, as well as more general courses on the background and scientific basis for river and stream restoration.
- Our workshop leaders are experienced researchers and practitioners who work with participants in a collaborative, hands-on manner in both classroom settings and the field.

PRRSUM

PARTNERSHIP FOR RIVER RESTORATION AND SCIENCE IN THE UPPER MIDWEST

Home

4th Annual Upper Midwest Stream Restoration Symposium

February 24-27, 2013
La Crosse, Wisconsin

Call for Abstracts will be coming out July 2nd! We welcome your suggestions for short courses and invited speakers.

PRRSUM is now on LinkedIn, Facebook, and Twitter (@PRRSUM). Please follow us!

Partnership for River Restoration and Science in the Upper Midwest

Partnership Description

River research and restoration in the Upper Midwest is an area of intense activity involving federal and local agencies, watershed managers, consultants, researchers, and educators. There is a clear demand for discussion, knowledge exchange, and collaboration between these entities, including two-way exchanges between research and practice as well as interagency communication. To address this need, the National Center for Earth-surface Dynamics (NCED) and the St. Anthony Falls Laboratory (SAFL) at the University of Minnesota are organizing a Partnership for River Restoration and Science in the Upper Midwest (PRRSUM, pronounced "prism").

PRRSUM

PARTNER

Home M

Home

4th osium

Call for and invited

Experiments on Rivers: The Consequences of Dams An Interdisciplinary Conference

Thursday and Friday, November 11-12, 2010

Partnership
River resea shed managers,
consultants ween these
entities, including two-way exchanges between research and practice as well as interagency communication. To address this need, the National Center for Earth-surface Dynamics (NCED) and the St. Anthony Falls Laboratory (SAFL) at the University of Minnesota are organizing a Partnership for River Restoration and Science in the Upper Midwest (PRRSUM, pronounced "prism").

PRRSUM

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Partnership
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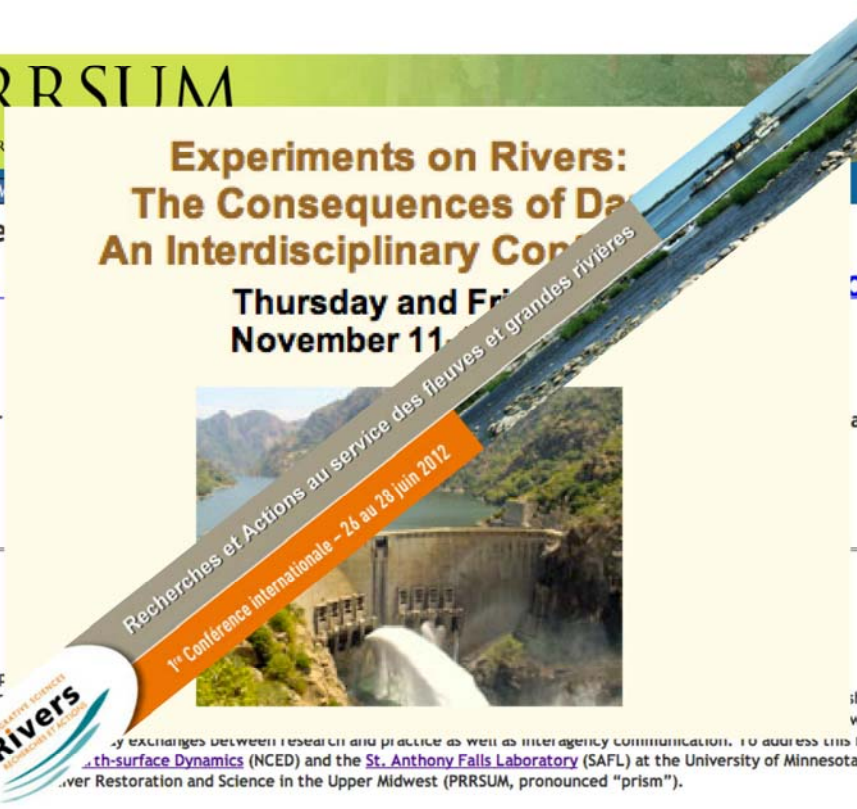


MARSEILLE : BMVR ALCAZAR - MAISON DES SCIENCES - BIBLIOTHÈQUE SAINT-ANDRÉ
TOUT PUBLIC - GRATUIT

LE PROGRAMME COMPLET EN LIGNE : WWW.PRINTEMPSDESCHERCHEURS.FR

A SIP OF SCIENCE

Something from Nothing: the mystery of landscape patterns
Professor Chris Paola
Red Stag Supper Club
Look out the window of an airplane and you will likely encounter a sight that U of M Geology & Geophysics Professor Chris Paola describes as "something miraculous." Beautiful, striking, and well-organized landscape patterns are one of the great mysteries in nature. Join us for happy hour as Prof. Paola discusses what scientists are learning about these fascinating formations.

Research at the Red Stag is a new science happy hour sponsored by the National Center for Earth-surface Dynamics. It is a chance to hear about new and exciting work over beer, in a cool bar. Come talk with the experts about their efforts to address some of the Earth's most pressing problems. NCED's Research at the Red Stag brings the wonders of science to happy hour.

A SIP OF SCIENCE

RESEARCH AT THE RED STAG - Second Wednesday of the Month

Out, out damn'd dam: freeing wild rivers
Wednesday, November 10, 5:30p.m.
Red Stag Supper Club, 509 1st Ave. NE
No cover

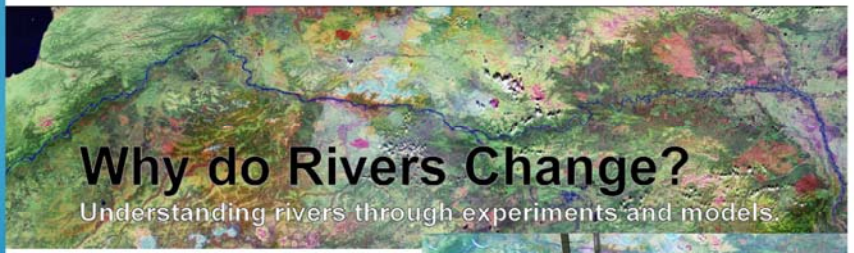
Dr. Gordon Grant, a research hydrologist with the USDA Forest Service, works on some of the largest dam removal projects in North America. Addressing the "juicy problems" that accompany such large-scale ecological changes, Dr. Grant will lead a lively discussion on the complexities of removing a long-standing dam and environmental management in the wake of its removal.

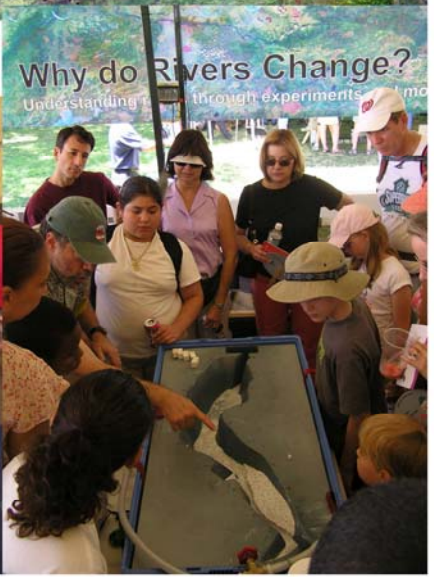
The talk takes place during happy hour at the Red Stag Supper Club || Food and Drink Available for Purchase

Smithsonian

2012

FOLKLIFE FESTIVAL





III. Disciplines, Masters, PhD's, Funding….etc

http://www.france.fr/etudier/se-former/formations-longues/master-recherche-ou-master-professionnel-quelles-differences

DENTES

DÉPARTEMENT ENVIRONNEMENT TECHNOLOGIE ET SOCIÉTÉ

Formations | Inscriptions | Vie étudiante | Vie du département | Recherche | Colloques et manifestations | Contacts | Ce qu'ils sont devenus

Edito

Les Universités marseillaises se réorganisent pour une plus grande cohérence, pour une plus grande lisibilité nationale et internationale. Dans le cadre de cette restructuration , l'environnement est un domaine où les études et les recherches prennent leur sens dans leurs applications en situation (...)

Lire la suite

Un Département universitaire consacré aux métiers de l'environnement

Le domaine de l'environnement est un domaine où les études et les recherches prennent leur sens dans leurs applications en situation professionnelle.

Les filières professionnelles, bien ciblées et portées par des enseignants-chercheurs et des professionnels en activité sont aujourd'hui très attractives pour les étudiants.

Nos différents parcours universitaires constituent des formations diplômantes de qualité, labellisées à l'international et ouvertes aux échanges avec l'étranger.

De plus notre Département fut à l'avant-garde des Instituts Universitaires Professionnels en environnement (I.U.P) dont l'objet était de former des étudiants capables de s'insérer rapidement dans le monde professionnel. Les très bons résultats obtenus en terme d'emplois nous ont toujours encouragés à

Nos formations

- **Licence Sciences et Technologie :**

Parcours "Environnement, Technologie et Société".

- **Licences Professionnelles :**

Aménagement paysager

Valorisation et Commercialisation des Plantes Aromatiques Méditerranéennes

- **Masters à finalité professionnelle :**

Les Grandes Écoles d'ingénieurs

IGERT

Integrative Graduate Education and Research Traineeship

NSF - 2012 Video & Poster Competition

SEE AWARDEES

IGERT 2012 Annual PI Meeting

Conference Video Archive Now Available »

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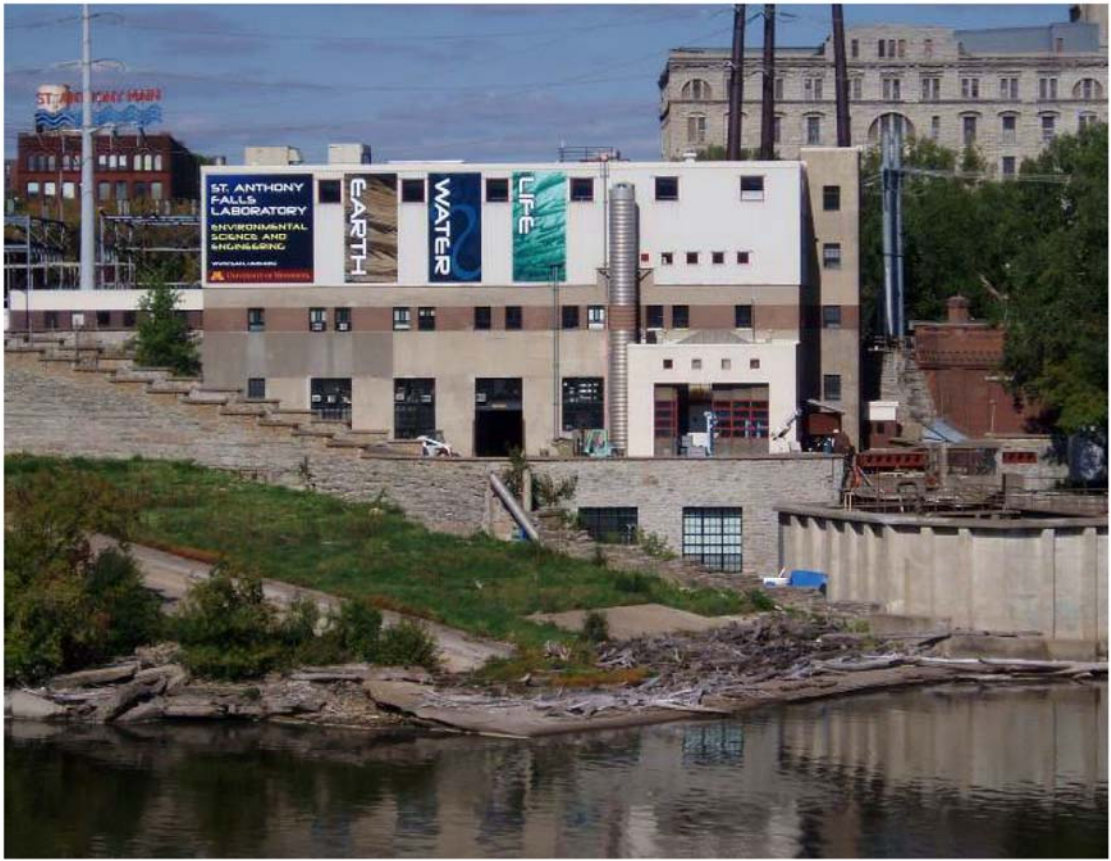
Interdisciplinary graduate education spanning science, technology, engineering, mathematics and social sciences

About IGERT

IGERT is the National Science Foundation's flagship interdisciplinary training program, educating U.S. Ph.D. scientists and engineers by building on the foundations of their disciplinary

IGERT Resource Center

The IGERT Resource Center (IGERT.org) provides comprehensive information about IGERT and each of its actively funded projects. The Resource Center provides an e-community for current


ST. ANTHONY MAIN
ST. ANTHONY FALLS LABORATORY
ENVIRONMENTAL SCIENCE AND ENGINEERING
EARTH
WATER
LIFE

- PhD duration
- Age and experience
- Scope
- Funding