13th Chico Topology Conference
Titles and Abstracts
(Last Updated: May 2, 2012)

Invited Speakers

Speaker: **Chris Herald**, UN, Reno
Title: An $SU(3)$ Casson invariant of rational homology spheres

Abstract: In this talk I will describe joint work in progress with Hans Boden, which develops an $SU(3)$ Casson invariant of rational homology spheres. This invariant extends the integer-valued invariant of integral homology spheres defined in earlier work by the authors together with Paul Kirk. After perturbing the flatness equation to obtain a flat moduli space consisting of finitely many points, we begin with an algebraic count of the irreducible points, and then add suitable correction terms for the reducible points and two types of non-central abelian points. The correction terms are defined in terms of spectral flow of the odd signature operator, and have the property that the algebraic count of irreducible points plus the correction terms is perturbation independent.

Speaker: **Sergio Macias**, UNAM
Title: On the $\frac{1}{2}$-homogeneity of the hyperspace suspension of continua.

Abstract: (with Patricia Pellicer-Covarrubias) A continuum is a compact connected metric space. A continuum X is $\frac{1}{2}$-*homogeneous* provided that there are exactly two orbits for the action of the group of homeomorphisms of the space onto itself. Given a continuum X, consider its hyperspace of subcontinua $C(X)$ and its hyperspace of singletons $F_1(X)$, with the topology induced by the Hausdorff metric. The hyperspace suspension of X is defined by $HS(X) = C(X)/F_1(X)$, with the quotient topology. We present some necessary and/or sufficient conditions under which $HS(X)$ is $\frac{1}{2}$-homogeneous.

Speaker: **Van Nall**, University of Richmond
Title: Inverse Limits with a Single Set valued function on $[0, 1]$

Abstract: It is difficult to characterize the continua that are inverse limits with a single set valued function on $[0, 1]$. The approach we take is to eliminate as many types of continua as we can and see what is left. For example no finite graph is an inverse with a single set valued function on $[0, 1]$ except an arc. We will concentrate in this talk on cyclically connected and circle like continua showing that many but not all of these cannot be obtained as the inverse limit with a single set valued function on $[0, 1]$.

Speaker: **Janusz Prajs**, CSU, Sacramento
Title: Isometrically Homogeneous Continua - a continuum theory approach, Part II

Abstract. This talk is about studying arc connectedness, aposyndesis, indecomposability and semi-indecomposability in continua admitting a compatible isometrically homogeneous metric. This is a continuation and extension of the presentation I gave on isometrically homogeneous continua in 2012 Spring Topology and Dynamics Conference.

Speaker: **Liam Watson**, UCLA
Title: A conjecture relating Heegaard Floer homology and the fundamental group

Abstract: A group is left-orderable if it admits a strict total order of its elements that is invariant under multiplication on the left. As an immediate consequence (exercise!), left-orderable groups are torsion free. For example, a finite cyclic group cannot be left-ordered; hence the fundamental group of a lens space is not left-orderable. L-spaces provide a generalizations of lens spaces in the context of Heegaard Floer homology. These manifolds have simplest possible Heegaard Floer homology, though they need not have cyclic fundamental group. This talk will describe some evidence supporting the conjecture that L-spaces are equivalent to 3-manifolds with non-left-orderable fundamental group.

Contributed Talks

Speaker: **Jamison Barsotti**, CSU, Chico
Title: Minor Minimal Intrinsically Knotted Graphs with 21 Edges

Abstract: In this talk, we prove that the only minor minimal intrinsically knotted graphs with 21 edges are the fourteen graphs that are obtained through a series of Triangle-Y moves from the complete graph on 7 vertices.

Speaker: **Nadeeka de Silva**, Texas Tech University
Title: Span of Subcontinua

Abstract: Let Y be a continuum consisting of a ray limiting to continuum X. We prove that $\sigma(Y) \leq \max(\sigma(X), \sigma_0^*(X))$. Also related results are obtained for other versions of span. When $\sigma(X) = 0$ or when X is a simple closed curve, we have that $\sigma(Y) = \sigma(X)$. Using this, we construct for each closed subset C of $[0, 1]$ with $0 \in C$ a one-dimensional continuum Y_C such that the set of values of span of subcontinua of Y_C is the set C. Some other topics related to this will also be presented.

Speaker: **Jianhua Gong**, UAE University
Title: On some generalized mappings

Abstract: (with Xun Ge) In this talk, we give some characterizations of generalized mappings on generalized topological spaces, such as g–closed mapping, g–pseudo open mapping, g–quotient mapping; and we also establish some relationships among these mappings, which deepen Mapping Theory in Generalized Topology.

Speaker: **Charles Hagopian**, CSU, Sacramento
Title: Arcwise Connectivity in Plane Continua

Abstract: We will revisit the unsolved problem of characterizing arcwise connectivity in plane continua. No recent direct progress on this old problem will be presented in this talk. However, Janusz Prajs and I recently defined a plane continuum that is the union of two dense arc-components. We also proved a plane continuum in which every arc-component is dense can only have one, two, or uncountably many arc-components. This work was motivated by a question of Eldon Vought.

Speaker: **Alejandro Illanes**, UNAM
Title: Pseudo-homotopies of the Pseudo-arc

Abstract: Let P be the Pseudo-arc; two maps h, g from P into P are said to be pseudo-homotopic provided that there exist a continuum C, points s, t in C and a map H from $P \times C$ into P such that $H(p, s) = g(p)$ and $H(p, t) = h(p)$ for each p in P.

There are only two known types of pseudo-homotopies for maps into the pseudo-arc, namely those pseudo-homotopies H satisfying $H(P \times \{c\})$ is degenerate for each c in C or those for which there exists a map f from P into P such that $H(x, c) = f(x)$ for each (x, c) in $X \times C$. So the following problem arises naturally.

Problem 1. Do there exist pseudo-homotopies on the pseudo-arc different to the ones described in the paragraph above?

In this talk we discuss a partial answer, we have obtained, to Problem 1.

Speaker: **Hidefumi Katsuura**, San Jose State University
Title: Extending the Alternating series test

Abstract: Alternating series have the simplest of sign patterns. What about the numerous series with more complicated patterns? By inspecting the alternating series test closely, we expand it to a theorem that applies to more complicated sign patterns and beyond.

Speaker: **Steven C. Leth**, University of Northern Colorado, Greely
Title: A nonstandard approach to fixed point problems in the plane

Abstract: I will outline some ways in which the methods of nonstandard analysis can provide insight and additional tools for attacking fixed point problems in the plane. Fairly natural nonstandard conditions on a standard continuum can give rise to situations where a classic "dog chases rabbit" argument works. Results and conjectures from this approach will be discussed.

Speaker: **Marcus Marsh**, CSU, Sacramento
Title: Retractions and Inverse Limits

Speaker: **Veronica Martinez de la Vega**, UNAM
Title: Universal dendrite $D3$ can be obtained as a Mahavier Product

Abstract: (with Iztok Banik) We describe the way in which the Universal Dendrite $D3$ can be obtained as a Mahavier Product.

Speaker: **Chris Mouron**, Rhodes College
Title: The dynamics of group actions on continua.

Abstract: In this talk I will examine the dynamics of continuum-wise expansive group actions on continua. In particular I will look at the similarities and differences to corresponding results of continuum-wise expansive homeomorphisms. Several open problems will be discussed.

Speaker: **Shokry Nada**, Qatar University
Title: Order embedding

Abstract: The topic of this work is originated from the work done by L. Nachbin [Topology and order, Van Nostrand, Inc., New York (1965).]; it involves the embedding problem of topological ordered space in $\mathbf{R}^n$, where $\mathbf{R}^n$ is endowed with the euclidean topology and the vector order defined in the natural way. Starting with exploring an example of a 1–dimentional ordered topological space that is not embeddable in any $\mathbf{R}^n$, an attempt is made to determine the kind of 1–dimentional ordered spaces that can be embedded in $\mathbf{R}^n$; for some integer n.

Speaker: **Kathy Porter** Saint Mary's College of California
Title: On a Question of Van Mills

Abstract: In the paper *A Note on Fords Example* Jan Van Mill defines a property which we call *property VM*. He asks the question on whether a homogeneous, separable, metrizable space with this property is a coset space. We answer this in the affirmative.

Speaker: **Jody Ryker**, CSU, Chico
Title: Knotting of Graphs on 9 Vertices and 28 or More Edges

Abstract:

Objective: The research was conducted to show that there exists only one graph with 9 vertices and 28 or more edges that is MMIK.

Methods: Previous research shows that all graphs with 9 vertices and more than 30 edges have K_7 as a minor and thus are not MMIK. For the cases with between 29 and 30 edges, we were able to systematically show each graph with minimum degree more than 3 could not possibly be MMIK. For the (9,28) case, using similar methods, we showed only one graph with minimum degree more than 2 is MMIK.

Results: Of the graphs with 9 vertices and 30 edges, 55 graphs have an A9 minor, 5 are 2-apex, and 3 others have an IK minor other than A_9. Similarly, for graphs with 9 vertices and 29 edges, we found that 97 have an A_9 subgraph, 25 are 2-apex, 10 have an IK minor other than A_9, and 1 has an unknotted embedding. For the 28 edge case, we showed that 168 graphs have F_9 as a minor, 111 are 2-apex, 12 have an IK minor other than F_9, 2 have a graph with an unkotted embedding as a super, and 1 is MMIK.