Schedule

Sunday, July 16th:

??? Arrive at Pingree Park

6:00 - 7:00 p.m. DINNER

Monday, July 17th:

7:00 - 8:00 a.m. BREAKFAST

9:00 - 10:00 a.m. Anthony Quas, University of Victoria:
Coupling and Splicing (lecture 1)

10:30 - 11:30 a.m. Ayşe Şahin, Wright State University:
Extending basic objects beyond $\mathbb{Z}^d$: towers, odometer actions, and SFTs (lecture 1)

12:00 - 1:00 p.m. LUNCH

1:30 - 2:00 p.m. Kevin McGoff, University of North Carolina at Charlotte:
Factor maps and embeddings for random $\mathbb{Z}^d$ shifts of finite type

2:10 - 2:40 p.m. Steve Kass, Drew University:
Generalized Shift Spaces and Shear

2:50 - 3:20 p.m. Dennis Pace, University of Denver:
Surface entropy in $\mathbb{Z}^2$ subshifts

3:30 - 4:00 p.m. Sebastián Barbieri, University of British Columbia:
A strongly aperiodic SFT in the Grigorchuk group

4:30 - 5:30 p.m. Emmanuel Jeandel, Université de Lorraine:
Reducibility Relations with applications in multidimensional symbolic dynamics (lecture 1)

6:00 - 7:00 p.m. DINNER

Tuesday, July 18th:

7:00 - 8:00 a.m. BREAKFAST

12:00 - 1:00 p.m. LUNCH

1:30 - 2:00 p.m. Kostya Medynets, United States Naval Academy:
Invariant Random Subgroups of Full Groups of Bratteli diagrams

2:10 - 2:40 p.m. John Griesmer, Colorado School of Mines:
Recurrence and the Bohr topology

2:50 - 3:20 p.m. Jon Chaika, University of Utah:
The horocycle flow on strata of translation surfaces

3:50 - 4:20 p.m. Alejandro Maass, Universidad de Chile (CMM):
Wandering intervals in affine extensions of self-similar interval exchange maps: a symbolic dynamics approach

4:30 - 5:00 p.m. Olena Karpel, Institute for Low Temperature Physics, National Academy of Sciences of Ukraine / Institute of Mathematics of the Polish Academy of Sciences:
Decisive Bratteli-Vershik models (lecture 1)

5:10 - 5:40 p.m. Lori Alvin, Bradley University:
Characterizing unimodal maps with embedded odometers

6:00 - 7:00 p.m. DINNER

7:30 p.m. - ??? Open problem session

Wednesday, July 19th:

7:00 - 8:00 a.m. BREAKFAST

9:00 - 10:00 a.m. Emmanuel Jeandel, Université de Lorraine:
Reducibility Relations with applications in multidimensional symbolic dynamics (lecture 2)

10:30 - 11:30 a.m. Anthony Quas, University of Victoria:
Coupling and Splicing (lecture 2)

12:00 - 1:00 p.m. LUNCH

1:30 - 2:00 p.m. Raimundo Briceño, Tel Aviv University:
Pointwise techniques for pressure representation

2:10 - 2:40 p.m. Dominik Kwietniak, Jagiellonian University:
Invariant measures of sofic approximable shift spaces

2:50 - 3:20 p.m. Martha Łącka, Jagiellonian University:
Royal Measures and the Feldman Katok Pseudometric

3:30 - 4:00 p.m. Amanda Wilkens, University of Kansas:
Finitary isomorphisms of Poisson point processes

4:30 - 5:30 p.m. Ayşe Şahin, Wright State University:
Extending basic objects beyond $\mathbb{Z}^d$: towers, odometer actions, and SFTs (lecture 2)

6:00 - 7:00 p.m. DINNER

Thursday, July 20th:

7:00 - 8:00 a.m. BREAKFAST

12:00 - 1:00 p.m. LUNCH

1:30 - 2:30 p.m. Emmanuel Jeandel, Université de Lorraine:
Reducibility Relations with applications in multidimensional symbolic dynamics (lecture 3)

3:00 - 4:00 p.m. Ayşe Şahin, Wright State University:
Extending basic objects beyond $\mathbb{Z}^d$: towers, odometer actions, and SFTs (lecture 3)

4:30 - 5:30 p.m. Anthony Quas, University of Victoria:
Coupling and Splicing (lecture 3)

6:00 - 7:00 p.m. BANQUET

Friday, July 21st:

7:00 - 8:00 a.m. BREAKFAST

??? Depart Pingree Park (times dependent on participants' flight times)

Abstracts

Lori Alvin *Characterizing unimodal maps with embedded odometers*

In this talk we investigate a constructive characterization of kneading sequences belonging to unimodal maps with embedded odometers. We take the concept of a $\{0,1\}$-regular scheme, which can be used to generate all kneading sequences of unimodal maps whose turning points are regularly recurrent, and add an extra condition that guarantees the constructed kneading sequence will additionally belong to a unimodal map with an embedded odometer. Further, every kneading sequence belonging to a unimodal map with an embedded odometer can be constructed in this manner.

Sebastián Barbieri *A strongly aperiodic SFT in the Grigorchuk group*

An action of a finitely generated group over a Cantor set is called effectively closed if there is a Turing machine which recieves as input a cylinder and a generator and computes an effective aproximation of the complement of the image of such cylinder under the generator. I will show that every effectively closed action of a finitely generated group G can be realized as a factor of the G-subaction of an SFT in $G \times H_1 \times H_2$ for any pair of infinite f.g. groups H_1, H_2. As a corollary we obtain that any group of the form $G_1 \times G_2 \times G_3$ admits a strongly aperiodic SFT whenever all the G_i are finitely generated and have decidable word problem. In particular, we show how this theorem implies the existence of strongly aperiodic SFTs in the Grigorchuk group.

Raimundo Briceño *Pointwise techniques for pressure representation*

Building upon previous work, we present new sufficient conditions for efficient approximation of pressure and, in particular, topological entropy. First, we explain some previous results that were based on a measure-theoretic property of Gibbs measures known as strong spatial mixing and a combinatorial analogue. Next, we proceed to define strictly more general pointwise versions of these properties, explore some of their implications, and show that they are sufficient to obtain efficient approximation algorithms for pressure. Similar to previous results, the techniques make use of a special representation theorem for pressure but, in contrast, the new conditions may apply in more general supports and when there are multiple equilibrium states. Finally, we exhibit some natural examples supporting this last claim.

Jon Chaika *The horocycle flow on strata of translation surfaces*

Thinking of the $\mathrm{SL}(2,\mathbb{R})$ action on the space of translation surfaces in analogy to actions of lie groups on homogeneous spaces has been a profitable tool of inquiry. Over the past 2 decades many results for homogeneous spaces have been extended to this setting.This talk presents results that the horocycle flow on the space of translation surfaces behaves differently from the horocycle flow on homogeneous spaces. This is joint work with John Smillie and Barak Weiss.

John Griesmer *Recurrence and the Bohr topology*

The Poincare recurrence theorem says that whenever (X, m, T) is a probability measure preserving system and A is a set of positive measure, there are many values of k where $m(A \cap T^k A) > 0$. The exact structure of the set of times k where the intersection has positive measure has been studied extensively. We will summarize some classical and recent results and state some open problems.

Olena Karpel *Decisive Bratteli-Vershik models*

Bratteli-Vershik representations (BV-models for short) have been used to study mainly minimal Cantor systems, where they proved to be extremely useful. In particular, this approach allows to describe the simplex of invariant measures and orbit equivalence classes. The talk is devoted to Bratteli-Vershik models of general compact zero-dimensional dynamical systems generated by homeomorphisms. An ordered Bratteli diagram is called decisive if the corresponding Vershik map prolongs in a unique way to a homeomorphism of the whole path space of the Bratteli diagram. It is proved that a compact invertible zero-dimensional system has a decisive Bratteli-Vershik model if and only if the set of aperiodic points is either dense, or its closure misses one periodic orbit. Moreover, the notion of weak decisiveness (when the prolongations of the Vershik map are numerous, but all yield mutually conjugate systems) is studied. It is shown that the systems admitting weakly decisive BV-models also admit decisive BV-models. As an example, a decisive BV-model of the full shift on two symbols is described. This is a joint work with T. Downarowicz.

Steve Kass *Generalized Shift Spaces and Shear*

Generalized shift spaces are higher dimensional symbolic dynamical systems that generalize free products. We will look at examples of these systems and discuss their place in the class of systems with a property we call shear.

Dominik Kwietniak *Invariant measures of sofic approximable shift spaces*

Motivated by a recent interest in $\mathscr{B}$-free shifts we study ways in which shift spaces can be approximated by sofic shifts. We provide examples of shift spaces X such that one can approach a measure supported on X with an ergodic measure on a sofic shift with almost the same entropy. We show that $\mathscr{B}$-free shifts are among these examples. Our main tools are Ornstein's d bar and Feldman's f bar metrics together with the Davenport-Erdős theorem. We show that ergodic invariant measures of every shift space in that family are abundant and their structure resemble invariant measures of a transitive shift of finite type: *The ergodic measures are entropy dense*. That is, any invariant measure μ on X is a weak-star limit of a sequence of ergodic measures supported on X whose Kolmogorov-Sinai entropies also converge to the entropy of μ. This is a joint work with Jakub Konieczny (Oxford) and Michal Kupsa (Prague).

Martha Łącka *Royal Measures and the Feldman Katok Pseudometric*

The GIKN construction was introduced by Gorodetski, Ilyashenko, Kleptsyn, and Nalsky in [*Functional Analysis and its Applications*, **39** (2005), 21–30]. It gives a nonhyperbolic ergodic measure which is a weak* limit of a special sequence of measures supported on periodic orbits. This method was later adapted by numerous authors and provided examples of nonhyperbolic invariant measures in various settings. We prove that the result of the GIKN construction is always a loosely Kronecker measure in the sense of Ornstein, Rudolph, and Weiss (equivalently, standard measure in the sense of Katok, another name is loosely Bernoulli measure with zero entropy). For a proof we introduce and study the Feldman-Katok pseudometric $\bar{F}$. The pseudodistance $\bar{F}$ is a topological counterpart of the *f-bar* metric for finite-state stationary stochastic processes introduced by Feldman and, independently, by Katok, later developed by Ornstein, Rudolph, and Weiss. We show that every measure given by the GIKN construction is the $\bar{F}$-limit of a sequence of periodic measures. On the other hand we prove that a measure which is the $\bar{F}$-limit of a sequence of ergodic measures is ergodic and its entropy is smaller or equal than the lower limit of entropies of measures in the sequence. Furthermore we demonstrate that $\bar{F}$-Cauchy sequence of periodic measures tends in the weak* topology to a loosely Kronecker measure. This is a joint work with Dominik Kwietniak.

Alejandro Maass *Wandering intervals in affine extensions of self-similar interval exchange maps: a symbolic dynamics approach*

In this talk, we present some recent symbolic dynamics studies that allow one to construct affine extensions of self-similar interval exchange maps having wandering intervals. Particularly interesting are the associated fractals and the skew products which allow one to produce such extensions.

Kevin McGoff *Factor maps and embeddings for random $\mathbb{Z}^d$ shifts of finite type*

For any $d \geq 1$, random $\mathbb{Z}^d$ shifts of finite type (SFTs) were defined in previous work. For a parameter $\alpha \in [0, 1]$, an alphabet $\mathcal{A}$, and a scale $n \in \mathbb{N}$, one obtains a distribution of random $\mathbb{Z}^d$ SFTs by randomly and independently forbidding each pattern of shape $\{1, \ldots, n\}^d$ with probability $1 - \alpha$ from the full shift on $\mathcal{A}$. In this talk, I will discuss two main results (joint with Ronnie Pavlov) concerning random $\mathbb{Z}^d$ SFTs. First, we establish sufficient conditions on α, $\mathcal{A}$, and a $\mathbb{Z}^d$ subshift Y so that a random $\mathbb{Z}^d$ SFT factors onto Y with probability tending to one as n tends to infinity. Second, we provide sufficient conditions on α, $\mathcal{A}$ and a $\mathbb{Z}^d$ subshift X so that X embeds into a random $\mathbb{Z}^d$ SFT with probability tending to one as n tends to infinity.

Kostya Medynets *TBA*

In the talk, we will classify the ergodic invariant random subgroups (IRS) of simple AF full groups. AF full groups arise as the transformation groups of Bratteli diagrams that preserve the cofinality of infinite paths in the diagram. AF full groups are complete (algebraic) invariants for the isomorphism of Bratteli diagrams. Given a simple AF full group G, we will prove that every ergodic IRS of G arises as the stabilizer distribution of a diagonal action on X^n for some n, where X is the path-space of the Bratteli diagram associated to G. This is joint work with Artem Dudko.

Dennis Pace *Surface entropy in $\mathbb{Z}^2$ subshifts*

We define the notion of surface entropy, an extended real number associated with a $\mathbb{Z}^2$ subshift that, when paired with entropy, provides a more accurate prediction of the word count. We then discuss the behavior of surface entropy under factor maps, namely that surface entropy is not a conjugacy invariant and how it can be extended to one. Surprisingly, the eccentricity of the rectangles used to count words affects surface entropy; we discuss this relationship and how surface entropy varies as a function of eccentricity. Finally we discuss the class of numbers that can be realized as the surface entropy of a $\mathbb{Z}^2$ SFT.

Amanda Wilkens *Finitary isomorphisms of Poisson point processes*

We consider Poisson point processes over $\mathbb{R}^d$. As part of general theory for the isomorphism problem for actions of amenable groups, Ornstein and Weiss (1987) proved that any two Poisson point processes are isomorphic as factors, where the factor map commutes with the isometries of $\mathbb{R}^d$. We give a sketch of an elementary construction of an isomorphism of Poisson point processes that is finitary. This is joint work with Terry Soo (University of Kansas).