SEAM 2019 - Abstract List

Shams Alyusof - George Mason University - salyusof@gmu.edu

Title: *Weighted composition operators from the space S^p into Zygmund-type spaces.*

Abstract: In this talk, we characterize the bounded and the compact weighted composition operators from the space S^p of analytic functions on the open unit disk $\mathbb{D}$ whose derivatives are in the Hardy space H^p (for $p > 1$) into a Zygmund-type space $\mathcal{Z}_\mu$, where $f \in \mathcal{Z}_\mu$ if and only if f is analytic on $\mathbb{D}$ and satisfies the condition

$$\sup_{z\in\mathbb{D}} \mu(z)|f''(z)| < \infty,$$

where the weight μ is a positive continuous function on $\mathbb{D}$. This work expands the focus of our research on the weighted composition operators from a general Banach space X of analytic functions on $\mathbb{D}$ whose point-evaluation functionals are bounded into the space $\mathcal{Z}_\mu$ under the assumption (among others) that $K(z) \to \infty$ as $|z| \to 1$, where for $z \in \mathbb{D}$,

$$K(z) := \sup\{|f(z)| : f \in X, \|f\| \leq 1\}.$$

In the case of the space S^p, the above assumption is not valid, hence the general results obtained in our previous work are not applicable. This is joint work with Flavia Colonna, George Mason University.

Aleh Asipchuk - Georgia Southern University - aa07144@georgiasouthern.edu

Title: *Fejer method and Suffridge polynomials .*

Abstract: The Suffridge polynomials are very important examples of univalent in the unit disc polynomials of complex variable. In the talk I will show that they can be derived as optimizers in some extremal problems. The solution is done by Fejer method based on the Fejer-Riesz representation of non-negative trigonometric polynomials.

Debendra Banjade - Coastal Carolina University - dpbanjade@coastal.edu

Title: *Interpolation on Certain Subalgebras of Bounded Analytic Functions..*

Abstract: Let $K \subset \mathbb{Z}_+$ and define

$$H^\infty_K(\mathbb{D}) = \{f \in H^\infty(\mathbb{D}) : f^{(k)}(0) = 0, \quad \text{for} \quad \text{all} \ \ k \in K\}.$$

We consider those sets K for which $H^\infty_K(\mathbb{D})$ is an algebra under the usual product of functions. We prove Nevanlinna-Pick interpolation theorem on $H^\infty_K(\mathbb{D})$.

Ahmad Barhoumi - Indiana University - Purdue University, Indianapolis - abarhoum@iupui.edu

Title: *Asymptotics of Jacobi-type Polynomials on a Cross.*

Abstract: We investigate the asymptotic behavior of polynomials satisfying a non-Hermitian orthogonality relation on a symmetric cross in the complex plane. This is achieved by solving an associated Riemann-Hilbert problem [RHP]. In this talk, I will discuss the local RHP associated with the center of the cross and illustrate the need to consider asymptotics along subsequences via examples. This is a joint work with Maxim Yattselev.

Kelly Bickel - Bucknell University - kab074@bucknell.edu

Title: *Portraits of Rational Inner Functions.*

Abstract: This talk focuses on the structure of two-variable rational inner functions with singularities on the two-torus. We answer questions about "how singular" such functions can be using information pulled from their zero sets, their unimodular level sets, and any known non-tangential regularity at the singular points. We will also present some surprising connections between those three objects and illustrate many of our results with pictures. This is joint work with Alan Sola and James Pascoe.

Ray Cheng - Old Dominion University - rcheng@odu.edu

Title: *An extension of the Pythagorean theorem .*

Abstract: What would a Pythagorean theorem look like for a normed vector space without an inner product? Among other things, we have to adopt some notion of orthogonality. Our exploration will lead us to the weak parallelogram laws, and a version of the Pythagorean theorem taking the form of a family of inequalities. We'll close by surveying a wide variety of applications.

Arthur Danielyan - University of South Florida - adaniely@usf.edu

Title: *On Fatou's Theorem.*

Abstract: Let E be a set on the unit circle T of $\mathbb{C}$. We prove the following theorem. There exists an $f \in H^\infty$ which has no radial limits on E but has unrestricted limit at each point of $T \setminus E$ if and only if E is an F_σ of measure zero. The necessity of the condition that E is an F_σ is trivial. The formulated result in fact is a converse to Fatou's theorem on the a.e. existence of the radial limits.

Alberto Dayan - Washington University in St Louis - alberto.dayan@wustl.edu

Title: *Zeros of normalized sections of non convergent power series.*

Abstract: A well known result due to Carlson affirms that a power series f with finite and positive radius of convergence R has no Ostrowski gaps if and only if the sequence of zeros of its nth sections is asymptotically equidistributed to $\partial\mathbb{D}_R$. In this note, we extend this characterization to those power series with null radius of convergence, modulo some necessary normalizations of the sequence of the sections of f.

Walton Green - Clemson University - awgreen@clemson.edu

Title: *Uncertainty Principles in Control Theory for PDEs.*

Abstract: Uncertainty Principles, those specifically concerning annihilating pairs for the Fourier transform, have recently been applied the study of observability inequalities for PDEs. Using the classical Paneah-Logvinenko-Sereda Theorem and a more recent result by O. Kovrizhkin, we characterize the observable sets for wave and Schrodinger equations in one dimension and give a sufficient condition in higher dimensions.

Cong Hoang - James Madison University - hoangcq@jmu.edu

Title: *Weighted estimates for bilinear fractional integral operators and their commutators.*

Abstract: In this talk, we discuss several weighted estimates for bilinear fractional integral operators and their commutators with BMO functions. We also show a maximal function control theorem for these operators. As a corollary we are able to obtain new weighted estimates for the bilinear maximal function associated to the bilinear Hilbert transform, and a bilinear Stein-Weiss inequality.

Michael Jury - University of Florida - mjury@ufl.edu

Title: *Unbounded multipliers of the Drury-Arveson space.*

Abstract: We investigate holomorphic functions h in the unit ball of $\mathbb{C}^d$ for which the multiplication operator $M_h : f \to hf$ has dense domain in the Drury-Arveson space H^2_d. We show that there exist row contractive multipliers $A = (a_1, a_2, \dots)$ and $B = (b_1, b_2, \dots)$ such that $B = hA$ and the column $(A\ B)^t$ is a partial isometry. In turn the domains of M_h and M_h^* can be identified with the deBranges spaces $\mathcal{M}(A)$, $\mathcal{H}(B)$ respectively. The space $\mathcal{H}(B)$ is proved to be invariant for both the d-shift $(S_1, \dots, S_d)$ and its adjoint, thus making it a "doubly invariant subspace" of H^2_d. We are then able to extend a good portion of Sarason's work on such spaces in the disk, to the multivariable setting (though often requiring different proofs). This is joint work with Robert T.W. Martin.

Dima Khavinson - University of South Flordia - dkhavins@usf.edu

Title: *Offbeat questions regarding analytic continuation.*

Abstract: "Between two truths of the real domain, the easiest and shortest path quite often passes through the complex domain." -P. Painleve, 1900.

How far does the Newtonian potential of a solid bounded by an algebraic surface extend inside the solid? Why the gravitational potential of the oblate spheroid has algebraic singularities inside the body, and for the prolate spheroid the singularities are transcendental? Why is the celebrated Schwarz reflection principle never discussed in dimensions higher than 2? How does one find singularities of an axially symmetric harmonic function in the ball from the coefficients in its expansion by spherical harmonics? If a needle (line) intersects a spherical shell over two disjoint segments and a harmonic function in the shell vanishes on one, does it have to vanish on the other one? What about the torus? We shall discuss these questions in the unified light of analytic continuation of solutions to linear analytic pde.

Ishwari Jang Kunwar - Fort Valley State University - kunwari@fvsu.edu

Title: *Sparse Domination of Multilinear Dyadic Operators and their Commutators.*

Abstract: We show that multilinear dyadic paraproducts and Haar multipliers, as well as their commutators with locally integrable functions can be pointwise dominated by multilinear sparse operators. As a consequence, we obtain various weighted norm inequalities for these operators.

Alan Legg - Purdue University Fort Wayne - leggar01@pfw.edu

Title: *Quadrature Domains and Equilibrium on the Sphere.*

Abstract: Consider the unit sphere as a conductor, and place a unit charge on it which is free to redistribute into the configuration of lowest possible logarithmic energy. Then, place finitely many point charges of like charge onto the sphere. How will the initial unit charge redistribute in the presence of these point charges? We'll show that the answer has to do with planar quadrature domains.

Wenjing Liu - University of New Hampshire - wbs4@wildcats.unh.edu

Title: *A characterization of tracially nuclear C*-algebras.*

Abstract: We give two characterizations of tracially nuclear C*-algebras. The first is that the finite summand of the second dual is hyperfinite. The second is in terms of a variant of the weak* uniqueness property. The necessary condition holds for all tracially nuclear C*-algebras. When the algebra is separable, we prove the sufficiency.

Mark E. Mancuso - Washington University in St. Louis - mark.mancuso@wustl.edu

Title: *Canonical Forms of Tuples of Operators and Applications to Convexity.*

Abstract: We introduce a notion of partial matrix convexity associated with a list of symmetric polynomials in symmetric non-commuting variables. On the level of operator tuples, a canonical shift form is used to prove an Effros-Winkler Separation theorem for strong operator topology closed subsets of $B(\mathcal{H})^g$. This is a preliminary report on joint work with Igor Klep, Mike Jury, Scott McCullough, and James Pascoe.

Ryan W Matzke - University of Minnesota - Twin Cities - matzk053@umn.edu

Title: *Energy Optimization with Orthogonal Potentials on the Sphere.*

Abstract: The majority of energy minimization problems on the sphere involve potentials $P : \mathbb{S}^d \times \mathbb{S}^d \to \mathbb{R}$ such that $P(x, y)$ is maximized if $x = y$ and is minimized if $x = -y$. One often expects σ, the uniform measure on the sphere, or similar "nicely" distributed measures, to provide minimizers for the energy

$$I_P(\mu) = \int_{\mathbb{S}^d} \int_{\mathbb{S}^d} P(x, y) d\mu(x) d\mu(y).$$

What if instead we had a potential that was minimized when $\langle x, y\rangle = 0$, and was maximized when $x = \pm y$? The frame potential, introduced by J. Benedetto and M. Fickus, and the more general p-frame potential, introduced by M. Ehler and K. Okoudjou, are instances of such potentials. In such cases, it more often seems to be the case that minimizers of the energy are measures that avoid being "too" uniformly distributed.

Scott McCullough - university of florida - sam@ufl.edu

Title: *Free pluri-subharmonic functions.*

Abstract: A free rational function is pluri-subharmonic on a domain D if its complex Hessian is positive semideifinite on D. We will discuss characterizations of free rational pluri-subhharmonic functions in realization theoretic terms.

Mishko Mitkovski - Clemson University - mmitkov@clemson.edu

Title: *Fractal Uncertainty Principle.*

Abstract: I will discuss several forms of the uncertainty principle in harmonic analysis. The main accent will be on the recent fractal uncertainty principle of Bourgain and Dyatlov and our extensions of it. This is a joint work with B. Jaye.

Virginia Naibo - Kansas State University - vnaibo@ksu.edu

Title: *Bilinear estimates in analysis and PDEs.*

Abstract: The usual Leibniz rules express the derivative of a product of functions in terms of the derivatives of each of the factors. In an analogous sense, fractional Leibniz rules involve the concept of fractional derivative and allow to estimate the size and smoothness of a product of functions in terms of the size and smoothness of each of the given functions. Such bilinear estimates stem from the analysis of certain PDEs. In this talk I will present Leibniz-type rules for bilinear pseudodifferential operators with homogeneous symbols, including Coifman-Meyer multipliers, and with symbols in the bilinear Hörmander classes. Through different viewpoints, the estimates will be discussed in the settings of Triebel-Lizorkin and Besov spaces based on quasi-Banach spaces such as weighted Lebesgue, Lorentz and Morrey spaces.

Uthpala Nawalage - University of Toledo - Uthpala.Nawalage@rockets.utoledo.edu

Title: *Complex Symmetry of Weighted Composition Operators in Several Variables.*

Abstract: We will introduce a general class of conjugations related with weighted composition operators in weighted Bergman spaces on the unit ball. Then we will discuss the complex symmetry of weighted composition operators with respect to this class of conjugations.

Josiah Park - Georgia Tech - jpark685@gatech.edu

Title: *Energy on Spheres and Discreteness of Minimizing Measures.*

Abstract: It has been known that when an equiangular tight frame (ETF) of size $|\Phi| = N$ exists, $\Phi \subset \mathbb{F}^d$ (where $\mathbb{F} = \mathbb{R}$ or $\mathbb{C}$), for $p > 2$ the p-frame potential $\sum_{i \neq j} |\langle \varphi_i, \varphi_j|^p$ achieves its minimum value on an ETF over all sized N collections of vectors. We are interested in minimizing a related quantity: $\frac{1}{N^2} \sum_{i,j=1}^{N} |\langle \varphi_i, \varphi_j|^p$. In particular we ask when there exists a configuration of vectors for which this quantity is minimized over all sized subsets of the real or complex sphere of a fixed dimension (more precisely, for all probability measures). Also of interest is the structure of minimizers over all unit vector subsets of $\mathbb{F}^d$ of size N. We shall present some explicit minimizers for a few intervals of p along with numerical results and conjectures. Portions of this talk are based on recent work of D. Bilyk, A. Glazyrin, R. Matzke, and O. Vlasiuk, and might overlap with the talks of R. Matzke and O. Vlasiuk given at this conference.

James Eldred Pascoe - University of Florida - pascoej@ufl.edu

Title: *Computing matrix algebra dimension and other exotic applications of the Pick matrix.*

Abstract: We give an efficient solution to the following problem: Given $X_1, \ldots, X_d$ and Y some n by n matrices can we determine if Y is in the unital algebra they generate as a subalgebra of all n by n matrices? The solution also gives an easy method for computing the dimension this algebra. The solution relies on the computation of a certain Pick matrix which arises naturally in the theory of bounded interpolation. If time permits, we will discuss some related results on noncommutative Pick interpolation.

Sean Perry - Florida Atlantic University - sperry9@fau.edu

Title: *An upper bound on the number of images in a point-mass multi-plane gravitational lensing ensemble.*

Abstract: A standard approximation in gravitational lensing is to allocate the mass or masses forming the lenses into a finite number of planes between the source and the observer. Another is to treat masses and sources of light as points. Previously, an upper bound had been generated for the cases of n masses on one plane and one mass per plane with k planes. Herein, we untangle and denest the fractions composing the lensing equation, obtain a bound on the degree of the resulting polynomial in the impact parameter and it's complex conjugate, then use the method of Sylvester-resultants to produce a bound on the number of observed images.

Douglas T. Pfeffer - University of Florida - d.pfeffer@ufl.edu

Title: *Widom Theorem for Finite-Codimensional Subalgebras of a Class of Uniform Algebras.*

Abstract: Given a function $\phi \in L^\infty(\mathbb{T})$, its Toeplitz operator T_ϕ is defined by $T_\phi = PM_\phi$, where P is the orthogonal projection from $L^2(\mathbb{T})$ onto $H^2(\mathbb{T})$. In 1960, Harold Widom showed that T_ϕ is left-invertible if and only if there exists $\psi \in H^\infty(\mathbb{T})$ such that $\|\phi - \psi\| < 1$. Since then, instead of the algebra $H^\infty(\mathbb{T})$, various versions of this theorem have been established for the Neil Algebra (2017) and then for the 2-point Algebra (2018). In this talk, we establish a version of this theorem that holds for all finite-codimensional subalgebras of a broad class of uniform algebras. This work intimately extends the work done on the Neil and 2-point Algebras.

Ali Pirhadi - Oklahoma State University - pirhadi@okstate.edu

Title: *Real zeros of random trigonometric polynomials with pairwise equal blocks of coefficients.*

Abstract: It is well known that the expected number of real zeros of a random trigonometric polynomial $V_n(x) = \sum_{j=0}^{n} a_j \cos(jx), x \in (0, 2\pi)$ with the a_j being standard Gaussian i.i.d. random variables is asymptotically $2n/\sqrt{3}$. We investigate three different cases of random trigonometric polynomials with pairwise equal blocks of coefficients and prove that in each case (asymptotically) $\mathbb{E}[N_n(0, 2\pi)] \geq 2n/\sqrt{3}$.

Alexander Reznikov - Florida State University - areznikov@fsu.edu

Title: *Minimal discrete energy on Cantor sets.*

Abstract: We define the minimal Riesz N-point energy on Cantor sets and compare its asymptotic behavior (as N goes to infinity) to the asymptotic behavior of similarly defined energy on more regular sets.

Joris Roos - University of Wisconsin-Madison - jroos@math.wisc.edu

Title: *Averages of the simplex Hilbert transform.*

Abstract: The simplex Hilbert transform is a multilinear operator generalizing the classical Hilbert transform. It is a difficult open problem in harmonic analysis to decide whether this operator satisfies any L^p bounds. In this talk I will explain some joint work in progress with Polona Durcik, where we study a certain averaged version of the simplex Hilbert transform which is related to the simplex Hilbert transform in the same way as the bilinear Hilbert transform is related to the Calderón commutator. We obtain L^p bounds in two and three dimensions and a conditional result in higher dimensions.

Joel Rosenfeld - Vanderbilt University - joel.rosenfeld@vanderbilt.edu

Title: *Incorporating Dynamical Systems into Reproducing Kernel Hilbert Spaces.*

Abstract: In this talk, we explore recent advances in dynamical systems that incorporate dynamical systems in a Banach space setting. After a brief discussion of occupation measures, we transport the ideas to the setting of reproducing kernel Hilbert spaces through the so called "occupation kernels." The reproducing kernel setting allows for a variety of data driven questions in dynamical systems theory to be addressed, such as that of system identification.

William Ross - University of Richmond - wross@richmond.edu

Title: *Zero sets and extremal functions for ℓ^p_A spaces.*

Abstract: In this joint work with Ray Cheng and Javad Mashreghi, we explore the zero sets for the ℓ^p_A spaces of analytic functions on the open unit disk whose Taylor coefficients belong to the sequence space ℓ^p. We do this through the use of extremal functions and Birkhoff-James orthogonality for Banach spaces. We show that when $p \neq 2$, the zero sets are not characterized by Blaschke sequences like they are when $p = 2$. We also make some interesting connections to work of Shapiro and Shields and prove versions of their Hilbert space results for Banach spaces.

Svetlana Roudenko - Florida International University - sroudenko@fiu.edu

Title: *Collapses and singularities in nonlinear PDE, interpolation inequalities and sharp constants.*

Abstract: We examine several nonlinear wave-type models such as Schrodinger, Hartree or Korteweg-de Vries -type equations and discuss solutions behavior for global existence vs forming a singularity in finite time. We show how interpolation inequalities and sharp constants help identify thresholds for the above behavior and then discuss the dynamics of solutions such as solitons and their stability, or instability leading to blow-up and collapses.

Benjamin Russo - Farmingdale State College - Russobp@farmingdale.edu

Title: *C^*-algebras and the Category of Stochastic Maps.*

Abstract: Stochastic maps are a generalization of functions in that they assign to each point in the domain a probability measure on the codomain. In this talk we will discuss the category of stochastic maps. In particular, we will explore some generalizations of probabilistic concepts resulting from the existence of a contravariant functor from the category of stochastic maps into the category of C^*-algebras. This is joint work with Arthur Parzygnat (UConn).

Khalid Said - University of Alabama - ksaid@crimson.ua.edu

Title: *The Numerical Range of the Sum of Two Projections.*

Abstract: In this presentation we examine some useful properties of the numerical range. We explore two different positions, generic and generalized generic positions. We show that two pairs of subspaces (M,N) and $(M^\perp, N^\perp)$ are unitarily equivalent if M and N are subspaces of C^n in generic position by constructing a unitary operator. We establish the relationships between two sets of the principal angles, the principal angles between M and N and the principal angles between $M^\perp$ and $N^\perp$. We use these relationships to compute the numerical range of the sum of two orthogonal projections onto M and N.

Meredith Sargent - University of Arkansas - sargent@uark.edu

Title: *Escaping non-tangentiality: controlled non-tangential approach and higher order regularity.*

Abstract: A classical Julia-Carathéodory theorem states that if there is a sequence tending to τ in the boundary of a domain D along which the Julia quotient is bounded, then the function ϕ can be extended to τ such that ϕ is nontangentially continuous and differentiable at τ and $\phi(\tau)$ is in the boundary of Ω. We develop a theory in the case of Pick functions where we consider sequences that approach the boundary in a controlled tangential way, yielding necessary and sufficient conditions for higher order regularity. In this talk, we discuss some of the technical details involved, including amortization of the Julia Quotient, γ-regularity, and γ-auguries.

Brian Simanek - Baylor University - Brian_Simanek@baylor.edu

Title: *Orthogonal Polynomials, Numerical Ranges, and Blaschke Products.*

Abstract: This talk will expose a recently observed connection between the theory of orthogonal polynomials on the unit circle (OPUC) and a wide variety of analytic objects. In particular, we will show how the zeros of OPUC relate to the numerical ranges of certain square matrices. We will also explain how these numerical ranges are related to the zeros of paraorthogonal polynomials on the unit circle through Poncelet's Theorem. This talk is based on joint work with Andrei Martinez-Finkelshtein and Barry Simon.

Alan Sola - Stockholm University - sola@math.su.se

Title: *Boundary behavior of rational inner functions on the tridisk.*

Abstract: This talk reports on ongoing joint work with K. Bickel (Bucknell) and J.E. Pascoe (UF). Boundary properties of rational inner functions in three variables, including derivative integrability and geometric properties of level surfaces of rational inner functions, will be discussed, and some examples will be examined in detail.

Susanna Spektor - Sheridan College institute of technology - susanna.spektor@sheridancollege.ca

Title: *Approximation of almost time and band limited functions by finite Hermite series.*

Abstract: The aim of this work is to investigate the quality of approximation of almost time- and almost band-limited functions by its expansion in two classical orthogonal polynomials bases: the Hermite basis and the ultraspherical polynomials bases. Also, we obtain the rate of convergence of the Legendre series expansion of the prolate spheroidal wave functions.

Cody Stockdale - Washington University in St. Louis - codystockdale@wustl.edu

Title: *A Different Approach to Endpoint Weak-type Estimates for Calderón-Zygmund Operators.*

Abstract: We discuss a different proof of the classical weak-type $(1,1)$ estimate for Calderón-Zygmund operators. This is a simplified adaption of a proof given by Nazarov, Treil, and Volberg addressing the nonhomogeneous setting. Applications of this proof strategy to the multilinear, weighted, and multilinear weighted settings are mentioned.

Alex Stokolos - Georgia Southern University - astokolos@georgiasouthern.edu

Title: *On a new family of extremal polynomials.*

Abstract: In the talk I will introduce a new family of algebraic polynomials and discuss their extremal properties. This is a joint work with D.Dmitrishin, K.Dyakonov and A.Smorodin.

Oleksandr Vlasiuk - Florida State University - ovlasiuk@fsu.edu

Title: *Minimizing p-frame energies.*

Abstract: The p-frame energy on the unit sphere $\mathbb{S}^d$ is defined as the functional $\iint_{\mathbb{S}^d} |x \cdot y|^p \, d\mu(x) d\mu(y)$, acting on probability measures μ supported on $\mathbb{S}^d$. When $p = 2$, the discrete minimizers of such energies are unit norm tight frames. It is however the case of $p \notin 2\mathbb{N}$ that appears to be the most interesting, as then the kernel of the above functional is not positive definite. For such p, tight spherical designs and optimal codes arise as minimizers over all probability measures. We will discuss solutions for some values of d and $p \notin 2\mathbb{N}$, obtained using linear programming methods, as well as general criteria for the discreteness of minimizing measures.

Nathan Wagner - Washington University in St Louis - nathanawagner@wustl.edu

Title: *A Functional Decomposition of Finite Bandwidth Reproducing Kernel Hilbert Spaces.*

Abstract: In this talk we consider "bandwidth-J" analytic reproducing kernels and their corresponding Hilbert spaces which have polynomial orthonormal bases of the form $(a_0 + a_1 z + \cdots + a_J z^J) z^n$. Our specific focus will be on bandwidth-2 spaces which are also referred to as "five diagonal" spaces. Our work centers on a particular family of spaces with basis elements given by

$$f_n(z) = \left(1 - e^{-i\theta} \left(\frac{n+1}{n+2}\right)^p z\right) \left(1 - \left(\frac{n+1}{n+2}\right)^p z\right) z^n.$$

We obtain an explicit functional decomposition of these spaces for nonzero θ and $p > 1/2$ in analogy with a previous result in the tridiagonal case due to Adams and McGuire. We also prove that multiplication by z is a bounded operator on these spaces and that they contain the polynomials. We finally discuss how these results generalize to higher bandwidth spaces. This talk is based on joint work with Gregory Adams at Bucknell University.

Li-An Daniel Wang - Sam Houston State University - daniel.wang@shsu.edu

Title: *PDE Characterization of Anisotropic Hardy Spaces .*

Abstract: We characterize the anisotropic Hardy space via a parabolic differential equation of Calderon and Torchinksy. The resulting differential operators do not seem to be readily classified under existing literature.

Xuan Wang - University of Alabama - xwang158@crimson.ua.edu

Title: *Harmonic Conjugation in Variable Exponent Harmonic Bergman Spaces.*

Abstract: *Preliminary report.* Let u be a harmonic function in the unit disc, and let v be its harmonic conjugate, normalized so $v(0) = 0$. If $u \in h^p$ (in the sense of having bounded p^{th} integral means), the well known theorem of M. Riesz says that $v \in h^p$ for $p > 1$. It is also well known that this fails for $p \leq 1$. It is perhaps less well known that if $u \in a^p$, the harmonic Bergman space, that $v \in a^p$, and this result holds for all $0 < p < \infty$. In this talk we discuss progress towards extending this result to variable exponent Bergman spaces.

Ruhan Zhao - College at Brockport, SUNY - rzhao@brockport.edu

Title: *Weighted composition operators that preserve frames.*

Abstract: We characterize weighted composition operators that preserve frames, tight frames, or normalized tight frames in the general weighted Hilbert Bergman spaces on the unit ball of $\mathbb{C}^n$. This is a joint work with Jasbir Singh Manhas and Gabriel T. Prajitura.
