Abstracts for Student Posters (Alphabetically Ordered)

All Student Poster Presentations are in Anishnabeg Room.

Each poster board has an ID name as P(LastName).

The student posters must be posted by 2:45 pm on October 11

The student authors must be at their posters from 5:10 pm – 6:00 pm, October 11

The first author in the following list is the presenter, unless an asterisk (*) is used to indicate the presenter.

ID	**P(Adepoju)**
Title	Robustness of exponentiated F-distribution to outlying observation(s) in one way analysis of variance
Authors	Kazeem Adesola Adepoju, Olanrewaju Ismail Shittu, Angela Unna Chukwu University of Ibadan, Nigeria
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In this paper a new three-parameter generalized version of the Fisher Snedecor distribution called exponentiated F-distribution which eliminates the assumption of equal group variances from one-way analysis of variance due to the presence of outlier is being introduced. The comprehensive account of the statistical properties of the new distribution was considered. In the end, to show the flexibility of this distribution as well as its robustness, an application using a real data set is presented. We suggest that the new distribution be used in most applications where the assumption underlying the use of conventional F distribution for one-way analysis of variance is violated (as result of the presence of outlier).	

ID	**P(Afuecheta)**
Title	On the characteristic function for asymmetric student's t distribution
Authors	Emmanuel Afuecheta University of Manchester, UK
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Following up on Nadarajah and Teimouri [Econometric Reviews, 31, 2012, 475-481], we derive here, for the first time, explicit closed form expressions for the characteristic function of the asymmetric student's t distribution. The expressions involve hyper-geometric and Bessel type functions.	

ID	**P(Aipenova)**
Title	A class of nonparametric density derivative estimators based on global Lipschitz conditions
Authors	Aziza Aipenova Kazakh National University, Kazakhstan Mynbaev Kairat Kazakh British Technical University, Kazakhstan Carlos Martins-Filho University of Colorado. CO, USA
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Estimators for derivatives associated with a density function can be useful in identifying its modes and inection points. In addition, these estimators play an important role in plug-in methods associated with bandwidth selection in nonparametric kernel density estimation. In this paper we extend the nonparametric class of density estimators proposed Mynbaev and Martins-Filho (2010) to the estimation of *m*-order density derivatives. Contrary to some existing derivative estimators, the estimators in our proposed class have a full asymptotic characterization, including uniform consistency and asymptotic normality. An expression for the bandwidth that minimizes an asymptotic approximation for the estimators' integrated squared error is provided. A Monte Carlo study sheds light on the finite sample performance of our estimators and contrasts it with that of density derivative estimators based on the classical Rosenblatt-Parzen approach.	

ID	**P(Al-Aqtash)**

Title	Gumbel-Weibull distribution: Properties and applications
Authors	Raid Al-Aqtash, Carl Lee, Felix Famoye Central Michigan University, MI, USA
e-mail	alaqt1rm@cmich.edu
A new family of distributions is defined by combining two continuous distributions through a logit function. A member of this family, the Gumbel-Weibull distribution, is studied. Some properties; including shapes, Shannon entropy, mean deviations, regions of unimodality and bimodality, moments and skewness are discussed. Applications to some real world data are presented.	

ID	**P(Aljarrah)**
Title	A new Weibull-Pareto distribution and its applications
Authors	Mohammad Aljarrah, Felix Famoye, Carl Lee Central Michigan University, MI, USA
e-mail	aljar1ma@cmich.edu
A new Weibull-Pareto distribution is introduced and studied in detail. Various properties of the distribution are discussed. The distribution is found to be unimodal or bimodal and can be skewed to the right or skewed to the left. The relationships between the parameters and the mean, variance, skewness, and kurtosis are discussed. The expressions for the moments, mean deviation and entropy are obtained. The method of maximum likelihood is proposed for estimating the parameters of the distribution. Two real data are applied to illustrate the flexibility of the distribution.	

ID	**P(Alzaghal)**
Title	Exponentiated Weibull-exponential distribution: Properties and applications
Authors	Ahmad Alzaghal, Felix Famoye, Carl Lee Central Michigan University, MI, USA
e-mail	alzag1am@cmich.edu
A new family of distributions called exponentiated T-X distribution is defined. A member of the family, namely, the three-parameter exponentiated Weibull-exponential distribution is defined and studied. Some of its properties including distribution shapes, limit behavior, hazard function, Shannon entropy, moments are discussed. Applications to real world data are also provided.	

ID	**P(Chan)**
Title	Statistical modelling of price commodities
Authors	Stephen Chan, Emmanuel Afuecheta University of Manchester, UK
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We propose a model for pricing of commodities over the years [1998-2013]. It is common that commodities return series exhibit many non-normal characteristics that cannot be captured by the standard GARCH Model. Therefore our model we propose is a new GARCH model with a new error conditional distribution. It describes the trajectory price movement of some commodities and gives a good fit to the data within the period under study. The parameters of the model are estimated by the method of maximum likelihood. The fitted models are used to make future predictions.	

ID	**P(Chanialidis)**
Title	Efficient and exact MCMC algorithm for COM-Poisson regression models.
Authors	Charalampos Chanialidis University of Glasgow, UK
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Due to their equal-mean-variance assumption Poisson regression models are sometimes inappropriate. The COM-Poisson distribution allows capturing both over-dispersion and under-dispersion. Its normalization constant cannot be expressed in closed form, making exact inference expensive. Using approximations for	

the normalization constant allows for fast, but often inaccurate algorithms. We propose an efficient and exact MCMC algorithm based on the idea of retrospective sampling. This idea can also be applied to adaptive DP-mixtures of COM-Poisson regression models, which can be used as a generic tool for density/quantile regression for discrete data.

ID	**P(Dassanayake)**
Title	Local orthogonal polynomial expansions for density estimation
Authors	Amali Dassanayake Texas Tech University, TX, USA
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We propose a new method to estimate the density function of a univariate continuous random variable. This new method, local orthogonal polynomial expansions (LOrPE), draws similarities with kernel density estimation (KDE), orthogonal series density estimation (OSDE) and local likelihood density estimation (LLDE). It is most similar to LLDE in that it is a local method where the approximation is obtained at each point of the support. It is connected to the OSDE in that it is constructed by using an orthogonal polynomial series expansion at each point of the support. The order of the series (M) used is one of the method's tuning parameters, a localized version of OSDE. Finally, LOrPE utilizes a bandwidth (h), the second tuning parameter, in order to construct the orthogonal polynomials over a localized window, and in this respect it is similar to KDE. Also, we show that under certain conditions, LOrPE is equivalent to KDE with a high order kernel. Comparisons of LOrPE with KDE are performed under a variety of conditions. We find that in terms of MISE, LOrPE performs better than KDE when estimating densities with sharp boundaries and both LOrPE and KDE results remain same when estimating densities which decay slowly to zero at infinity.

ID	**P(Hao)**
Title	A variety of new extreme value distributions based on a random number of variables
Authors	Jie Hao, Anant Godbole East Tennessee State University, TN, USA
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In this poster, we study the distribution of the maximum and minimum of a random number of random variables (r.v.s), X1, X2, . . . , XN, where each Xi has the same continuous distribution, and N is an independent discrete random variable. Some of the choices we make for the continuous r.v.s are the uniform, exponential, and Pareto distribution, and N is chosen to be geometric, Poisson, etc. We discuss the properties of the proposed distribution, such as the mean, the variance, the moment generating function and the moments. The parameter estimation is based on the maximum likelihood approach.

ID	**P(Huang)**
Title	Exponentiated Kumaraswamy-Dagum-Weibull distribution with applications to lifetime data
Authors	Shujiao Huang, Oluyede Broderick Georgia Southern University, GA, USA
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A new class of distributions called the exponentiated Kumaraswamy-Dagum-Weibull family of distributions is proposed. The family or class of distributions includes several sub-distributions, some of which are: the exponentiated Kumaraswamy-Dagum (EKD), exponentiated Dagum-Weibull (EDW), exponentiated Dagum (ED), Dagum-Weibull (DW), exponentiated Kumaraswamy exponentiated Dagum (EKED), exponentiated Kumaraswamy-Burr-Weibull (EKBW), exponentiated Kumaraswamy-Burr-exponential (EKBE), exponentiated Burr-Weibull (EBW), Burr-Weibull (BW), Burr-exponential (BE), exponentiated Kumaraswamy-Fisk-Weibull (EKFW), exponentiated Kumaraswamy-Fisk-exponential (EKFE), exponentiated Fisk-Weibull (EFW), Fisk-Weibull (FW), Fisk-exponential (FE), Burr, Fisk, and Dagum distributions. Statistical properties including series representation of the probability density function, hazard and reverse hazard functions, moments and entropy measures for this class of distributions and the sub-models are presented. Examples and applications as well as comparisons of the EKDW and its sub-distributions with other distributions are given.

ID	P(Imoto)
Title	A generalized Conway-Maxwell-Poisson distribution which includes the negative binomial distribution
Authors	Tomoaki Imoto Keio University, Japan
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The Conway-Maxwell-Poisson (COM-Poisson) distribution with two parameters was originally developed as a solution to handling queuing systems with state-dependent arrival or service rates. This distribution generalizes the Poisson distribution by adding a parameter to model over-dispersion and under-dispersion and includes the geometric distribution as a special case and the Bernoulli distribution as a limiting case. In my talk, we propose a generalized COM-Poisson (GCOM-Poisson) distribution with three parameters, which includes the negative binomial distribution as a special case. The new parameter plays the role of controlling length of tail.	

ID	P(Luo)
Title	Using linear approximations to relate the distributions of the highest order statistics from random samples of different sizes
Authors	Li Luo Texas Tech University, TX, USA
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Five different linear approximations are proposed to relate the distributions of the highest order statistics from random samples of size N and n from normal populations. The 1st method is using Monte Carlo simulation to obtain two finite samples; the 2nd method uses Taylor series expansions of the quantile function to linearly relate the means. Another two methods are using respectively extreme value theory, and recent limiting results on spacing between successive order statistics. The accuracies are discussed by comparing against Monte Carlo simulation. A general data-driven choice is linear regression method. Finally, the methodology is applied to the results of the 2009 International Mathematical Olympiad to adjust country scores with different population sizes.	

ID	P(Odubote)
Title	Weighted Feller-Pareto, Kumasrawamy-generalized Pareto and related distributions
Authors	Oluseyi Odubote Georgia southern University, GA, USA
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In this paper, some fundamental results on the weighted and parent Feller-Pareto and related distributions are presented. Moments, measures of uncertainty including Shannon and s-entropies are presented. Some applications are given. We also introduce the Kumaraswamy distribution and the class of generalized Pareto distributions, and presents results on a more flexible and generalized class of distributions called the Kumaraswamy generalized Pareto class of distributions. Pareto type distributions are flexible parametric models with applications in reliability, actuarial science, economics, finance and telecommunications. We study some mathematical and statistical properties of the Kumaraswamy generalized Pareto distribution including the hazard function, reverse hazard function and moments with particular emphasis on the class of generalized Pareto sub-models.	

ID	P(Okwonu)
Title	Effect of heteroscedastic variance covariance matrices on two groups linear classification Techniques
Authors	Friday Zinzendoff Okwonu, Abdul Rahman Othma, Yahya Abu Hasan, Hamadi Dieng University Sains, Malaysia
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The authors investigate the comparative classification performance of the two groups linear classification techniques. They compared the Fisher linear classification analysis and its robust version with the Filter linear classification rule and the LCM linear classification technique. These procedures are investigated using laboratory reared aedes albopictus mosquito data set and simulated data set generated based on heteroscedastic variance covariance matrices. The evaluation procedure is based on the comparison between the mean of the optimal probability and the mean probabilities of correct classification obtain for each technique. The comparative analysis revealed that the LCM rule is robust, unbiased and admissible.

ID	**P(Sherina)**
Title	Statistical properties of the weighted proportional inverse Weibull distribution
Authors	Valeriia Sherina, Broderick Oluyede Georgia Southern University, GA, USA
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In this paper, a general class of weighted proportional inverse Weibull distributions is proposed. This class of distributions contains the proportional inverse Weibull, length-biased inverse Weibull, inverse Weibull, Frechet distributions as special cases. The properties of this class of distributions, including the hazard function, reverse hazard function, monotonicity property, shapes, moments, coefficient of variation, coefficient of skewness, coefficient of kurtosis, Shannon entropy, Renyi entropy, s-entropy and Fisher information matrix are derived and studied. The method of maximum likelihood is used to estimate the parameters of this class of distributions. Finally, real data examples are discussed to illustrate the applicability of the models.	

ID	**P(Spiensma)**
Title	A new approach to analyze longitudinal epidemiological data with an excess of zeros
Authors	Alette Spriensma, Tibor Hajos, Michiel de Boer, Martijn Heymans, Jos Twisk VU University, Netherlands
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Our objective was to introduce a ‘new’ application of two-part joint regression modeling in longitudinal data analysis for outcome variables with an excess of zeros, and to compare the performance of this method to current approaches. We compared three techniques; linear mixed modeling, Poisson mixed modeling, and two-part joint binomial/Poisson mixed modeling, including random intercepts and random slopes. The two-part joint mixed model was a more appropriate method to analyze longitudinal data with an excess of zeros when a random intercept was included. However, in a model that also included random slopes the Poisson mixed model also performed remarkably well.	

ID	**P(Tweh)**
Title	The importance of human development programs in Liberia: A case study
Authors	Thomas M H Tweh United Methodist University, Liberia
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Considering the state of affairs in terms of Liberia’s Development Needs, both the private and public sectors need to collaborate in supporting the human development programs. I wish to discuss both the human and institutional need for Liberia using a case study.	

ID	**P(Wang)**
Title	Bayesian partially ordered probit/logit models with an application in course redesign
Authors	Xueqin Wang, Michael Sonksen, Kristin Umland University of New Mexico, NM, USA
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Intermediate Algebra (Math 120) at The University of New Mexico is a large core course serving approximately 2500 students per year. Under the traditional lecture-based teaching method, the passing rates for the course have consistently hovered around an unacceptable 45%. From Fall 2012, a new teaching model utilizing computer online learning with student individual study, which we call "Math 120 Learning Lab (MaLL)", was used on a pilot section of about 200 students. This study is to analyze and compare student performance from the traditional lecture sections and the MaLL. The only available data was the students' letter grades and demographic variables. Standard models for evaluating student pass rate (multilevel logistic regression) throw away information by treating all passing grades equally. We propose a new Bayesian approach: a partially ordered multinomial probit/logit model with random effects to model students' course score out of 100. This model does not throw away any grading information. A Markov Chain Monte Carlo algorithm was developed to fit to the model. We examined the impact of the prior distribution, produced faster algorithms for this sampling, and did model diagnostics for this partially ordered multinomial probit model with random effects. We compared the proposed model to standard models (Multilevel Logistic Model and Ordered Probit/Logit Models).

ID	**P(Witherspoon)**
Title	Generalization of the Odd Weibull Family for Competing Risk Analysis
Authors	Grace Witherspoon, Kahadawala Cooray Central Michigan University
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In time-to-event data, such as in medical research; competing risks are frequently encountered. However the event of interest and the competing event may not follow a common hazard shape. As opposed to using a nonparametric model, we consider a more flexible parametric model which will accommodate a wide variety of hazard shapes to properly capture the various shapes of the cumulative incidence functions. We consider a generalization of the odd Weibull distribution and make parametric inferences for the cumulative incidence functions under the maximum likelihood method; using cause-specific hazard approach and direct parametric modeling (Jeong and Fine, 2006). Finally the proposed model will be used to analyze the follicular cell lymphoma dataset.

ID	**P(Yang)**
Title	The Kumaraswamy generalized Lindley and related distributions with applications to lifetime data
Authors	Tiantian Yang, Broderick Oluyede Georgia Southern University, GA, USA
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In this paper, a new class of generalized distribution called the Kumaraswamy (Kum) generalized Lindley distribution as well as related sub-distributions are presented. This class of distributions contains the generalized Lindley (GL), Lindley (L), Length-biased Exponential (LBE) and exponential (EXP) distributions as special cases. Series expansion of the density is obtained. The properties of the distribution, including the hazard function, reverse hazard function, monotonicity property, shapes, moments, entropy and information are derived. The method of maximum likelihood is used to estimate the parameters of this new class of distributions. Finally, real data examples are discussed to illustrate the applicability of the models.

ID	**P(Zhang)**
Title	Multiple change-point detection in piecewise exponential hazard regression model with long-term survivors and right censoring
Authors	Lianfen Qian Florida Atlantic University and Wenzhou University Wei Zhang* Florida Atlantic University, FL, USA
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This talk proposes a multiple change-point detection algorithm for right censored failure times with long-term survivors when covariates are observed. The proposed algorithm combines the Kaplan-Meier estimator for the susceptible proportion and weighted least square estimators for the multiple change-points and other model parameters. A simulation study is conducted for various model parameter settings. The results show that the proposed algorithm works superiorly on detecting the number of change-points with almost ignorable misclassification rate and on estimating other model parameters even for small to moderate sample sizes. Last, the proposed method is used to analyze breast cancer data.

ID	**P(Zhu)**
Title	Bridging the gap: The Conway-Maxwell-Poisson process
Authors	Li Zhu, F. Sellers Georgetown University, DC, USA
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The Bernoulli and Poisson point processes are two popular discrete count processes. Both, however, result from strict assumptions that motivate the use of the respective processes. Instead, with the introduction of an associated generalized waiting time distribution, we propose a generalized count process that we call the Conway-Maxwell-Poisson process to serve as a generalized point process. This count process includes the Bernoulli and Poisson processes as its special cases, and serves as a bridge to describe general count processes. Various applications of count process modeling will be addressed to illustrate the flexibility of this process.