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QUARTERLY R&D Newsletter

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This issue covers Research & Development activities of Dibrugarh University for the Period of 1st July – 30th September, 2022.

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FACULTY OF SCIENCE
AND
ENGINEERING

Department of Physics

Journal Paper(s):

1. Rituparna Hazarika, Bulumoni Kalita, *Effect of oxygen vacancy defects on electronic and optical properties of MgO monolayers: First principles study*, Materials Science & Engineering B, 286 (2022) 115974.

Abstract:

The optoelectronic properties induced by oxygen vacancy defects in MgO (111) monolayers have been studied using hybrid level of DFT method. HSE calculations show significant reduction in electronic band gap of MgO monolayer as a result of introduction of oxygen vacancies. The pristine monolayer has a wide band gap (4.84 eV, indirect) semiconducting behaviour, which changes to 2.97 eV (indirect) and 2.28 eV (direct) with increment in oxygen vacancy defect concentrations of 6.25 % and 12.5 %, respectively. Consequently, presence of oxygen vacancies leads to energy red shift of the observed optical phenomena with reference to the pristine monolayer. Most importantly, the di-vacancy system with two consecutive vacancy sites displays the strongest optical absorption and also becomes optically responsive over the spectral range from visible to ultraviolet region in the electromagnetic spectrum. Thus creation of oxygen vacancies in MgO monolayers may be a fruitful technique for achieving a suitable solar energy material.

Department of Chemistry

Journal Paper(s)

1. Shikha Rani Borah and Geetika Borah, *Silica supported spinel structured cobalt ferrite multifunctional nanocatalyst for hydration of nitriles and oxidative decarboxylation of phenylacetic acids*, Applied Organometallic Chemistry, 36(11) 16Aug. 2022, DOI: 10.1002/aoc.6864.

Abstract:

The silica-supported cobalt ferrite spinel nanocatalyst has been successfully synthesized by the coprecipitation method and extensively characterized by FTIR, XRD, SEM-EDX, TEM, BET, VSM, XPS, TGA, and ICP-AES analysis. The bands observed at 3435 cm^{-1} (ν OH of Si-OH) and 1637 cm^{-1} (γ OH of Si-OH) in the FTIR spectrum of the as-synthesized nanocatalyst unambiguously tell the presence of silica support. Moreover, a very weak intensity and a medium intensity peak at 683 cm^{-1} and 463 cm^{-1} suggested intrinsic stretching vibrations of Fe-O and Co-O of cobalt ferrite, respectively. The XRD pattern confirms the formation of CoFe_2O_4 spinel. The average crystallite size was found to be 5.4 nm as calculated by using the Debye–Scherrer equation based on the (220) plane while the average particle size was found to be 5.08 nm from TEM analysis. The crystalline nature of the nanocomposite was confirmed by the SAED pattern. The successful incorporation of CoFe_2O_4 on the surface of silica was established by the BET surface area measurements. The silica-supported cobalt ferrite nanocatalyst has been explored as a heterogeneous multifunctional catalyst for hydration of nitriles and oxidative decarboxylation of phenylacetic acids as well under mild reaction conditions with moderate to excellent isolated yield of the desired products (60–99%). The catalyst was magnetically recoverable within a time frame of 90 s and reusable up to the fifth catalytic cycle without profound loss of activity. A magnetic hysteresis study was performed to elucidate the magnetic behavior of the catalyst. The saturation magnetization value of 39.785 emu/g with a coercivity value of 110.87 Oe and saturation remanence value of 5.185 emu/g clearly indicated the presence of a ferromagnetic component in the material.

2. Bidyutjyoti Dutta, Nilakshi Dutta, Apurba Dutta, Montu Gogoi, Sanjay Mehra, Arvind Kumar, Kalyanjyoti Deori, Diganta Sarma, *[DDQM][HSO4]/TBHP as a Multifunctional Catalyst for the Metal Free Tandem*

Abstract:

A bifunctional ionic liquid (IL) [DDQM][HSO₄] has been designed and explored as a three-way catalyst for the synthesis of 2-phenylquinazolin-4(3H)-ones from anthranilamide and benzyl alcohol in 3.5 min incorporating microwave irradiation. Photochemically the reaction proceeds for 4 h at room temperature and thermally for 8 h at 120 °C. Further IL-assisted metal, solvent, and base free in situ oxidation of benzyl alcohols to aldehydes shows its task specificity. The multifunctionality of the IL was reestablished with the synthesis of two Wnt pathway antagonists.

3. Apurba Dutta, Priyanka Trivedi, Praveen Singh Gehlot, Dipshikha Gogoi, Roktopol Hazarika, Pankaj Chetia, Arvind Kumar, Amrita Kashyap Chaliha, Vinita Chaturvedi, Diganta Sarma, *Design and Synthesis of Quinazolinone-Triazole Hybrids as Potent Anti-Tubercular Agents*, ACS Applied Bio Materials, Volume 5.

Abstract:

A straightforward and convenient methodology has been developed for the reaction of 2-aminobenzamide and carbonyls affording 2,3-dihydroquinazolin-4(1H)-ones using aqueous solution of [C₁₂Py][FeCl₃Br]. The developed methodology was applied for the synthesis of 25 quinazolinone-triazole hybrids followed by evaluation of their in vitro anti-tubercular (TB) activity. The results revealed that 8 quinazolinone-triazole hybrids displayed promising activity having MIC values of 0.78–12.5 µg/mL. The compound 3if with MIC 0.78 µg/mL was found to be the lead nominee among the series, better than Ethambutol, a first line anti-TB drug and comparable with Rifampicin. The active compounds with MIC values ≤ 6.25 µg/mL were subjected to in vitro cytotoxicity and found nontoxic. In drug–drug interaction, compounds 3ia and 3ii interacted synergistically with all the three anti-TB drugs, INH, RFM, and EMB. Other 3 compounds interacted either in synergistic or additive manners. Important information on the binding interaction of the target compounds with the active sites of 1DQY Antigen 85C from Mycobacterium tuberculosis and Enoyl acyl carrier protein reductase (InhA) enzymes was obtained from molecular docking studies. Screening of the drug-likeness properties and bioactivity score indicates that synthesized molecules could be projected as potential drug candidates. Based on the current study, quinazolinone-triazole hybrids framework can be useful in drug development for TB.

4. Priyanuj Krishnann Hazarika, Priyanka Gogoi, Roktopol Hazarika, Kalyanjyoti Deori, Diganta Sarma, *Nanostructured Ni(OH)₂-ZnO mixed crystals as recyclable catalysts for the synthesis of N-unsubstituted 1,2,3-triazoles*, Materials Advances, Volume: N/A (Accepted Manuscript)

Abstract:

A novel and sustainable way of constructing medicinally active compounds, 4-aryl-1,2,3-(NH)-triazoles, has been developed by employing Ni(OH)₂-ZnO nanostructured mixed crystals. The one-pot multicomponent synthesis giving nanosheet-like reusable catalysts in PEG-400 solvent is quite efficient, economical and can tolerate a wide range of substrates with excellent yields

5. Aziza Rahman, Bondeepa Saikia, Chimi Rekha Gogoi, Anupaul Baruah, *Advances in the understanding of protein misfolding and aggregation through molecular dynamics simulation*, Progress in Biophysics and Molecular Biology, DOI: <https://doi.org/10.1016/j.pbiomolbio.2022.08.007>.

Abstract:

Aberrant protein folding known as protein misfolding is counted as one of the striking factors of neurodegenerative diseases. The extensive range of pathologies caused by protein misfolding, aggregation and subsequent accumulation are mainly classified into either gain of function diseases or loss of function diseases. In order to seek for novel strategies for treatment and diagnosis of neurodegenerative diseases, insights into the mechanism of misfolding and aggregation is essential. A comprehensive knowledge on the factors influencing misfolding and aggregation is required as well. An extensive experimental study on protein aggregation is

somewhat challenging due to the insoluble and noncrystalline nature of amyloid fibrils. Thus there has been a growing use of computational approaches including Monte Carlo simulation, docking simulation, molecular dynamics simulation in the study of protein misfolding and aggregation. The review presents a discussion on molecular dynamics simulation alone as to how it has emerged as a promising tool in the understanding of protein misfolding and aggregation in general, detailing upon three different aspects considering four misfold prone proteins in particular. It is noticeable that all four proteins considered in this review i.e prion, superoxide dismutase1, huntingtin and amyloid β are linked to chronic neurodegenerative diseases with debilitating effects. Initially the review elaborates on the factors influencing the misfolding and aggregation. Next, it addresses our current understanding of the amyloid structures and the associated aggregation mechanisms, finally, summarizing the contribution of this computational tool in the search for therapeutic strategies against the respective protein-deposition diseases.

Conference Paper(s)

1. Bidyutjyoti Dutta, Diganta Sarma, *Microwave assisted metal free synthesis of quinazolin-4(3H)-one derivatives*, presented at the 29th CRSI National Symposium in Chemistry & CRSI-ACS Symposium Series in Chemistry, held at IISER Mohali, Punjab on July 07-09, 2022.

Abstract:

A novel bifunctional ionic liquid has been designed and explored for the first time as an efficient catalyst for the synthesis of medicinally important 2-phenylquinazolin-4(3H)-one derivatives starting from anthranilamide and benzyl alcohol derivatives under microwave irradiation. The newly developed ionic liquid was found to be a benchmark catalyst in this study which showed a breakthrough in catalytic performances, enabling the quantitative yield of the desired products under microwave irradiation. 2-phenylquinazolin-4(3H)-one was attained through one pot oxidative synthesis led by the ionic liquid.

2. Diganta Sarma, *[DDQM][HSO4] Ionic liquid as a Bifunctional Catalyst for the Synthesis of 2-Phenylquinazolin-4(3H)-ones under Microwave Irradiation*, presented at the International Conference on Frontier Areas of Science and Technology (ICFAST-2022), held at the University of Hyderabad, on September 09-10, 2022, proceedings published as International Conference on Frontier Areas of Science and Technology (ICFAST-2022)/Abstract Booklet (e-version).

Abstract:

A new acidic ionic liquid 1-dodecylquinolin-1-ium bromide([DDQM][HSO4]) has been designed and explored as a bifunctional catalyst for the tandem oxidative synthesis of 2-phenylquinazolin-4(3H)-ones. Starting from anthranilamide and benzy lalcohol derivatives; the prepared ionic liquid was found to be an efficient catalyst as well as solvent for the desired transformation providing quantitative yield under continuous microwave irradiation of 80W upto 130 °C for 3.50 minutes. Further metal/external acid-base/ligand free protocol for the rapid oxidative synthesis of medicinally important 2-phenylquinazolin-4(3H)-ones via in situ oxidation of benzyl alcohol derivatives using the designed ionic liquid adds a golden touch to the task-specificity of the ionic liquid.

Awards and Recognition received by group members

1. Dr. Anirban Garg, joined as an Assistant Professor at Jagannath Barooah College (Autonomous), Jorhat

2. Dr. Apurba Dutta, joined as an Assistant Professor at Dibrugarh Hanumanbax Surajmall Kanoi College, Dibrugarh
3. Dr. Parmita Phukan, joined as an Assistant Professor at North Lakhimpur College (Autonomous), Lakhimpur

Department of Statistics

Journal Paper(s)

1. Indranil Ghosh, David Watts, and Subrata Chakraborty, *Modeling bivariate dependency in Insurance Data via Copula: A brief study*, Journal of Risk and Financial Management, (ESCI, Scopus), ISSN 1911-8074, 15 (8): 329, <https://doi.org/10.3390/jrfm15080329>.

Abstract:

Copulas are a quite flexible and useful tool for modeling the dependence structure between two or more variables or components of bivariate and multivariate vectors, in particular, to predict losses in insurance and finance. In this article, we use the Vine Copula package in R to study the dependence structure of some well-known real-life insurance data and identify the best bivariate copula in each case. Associated structural properties of these bivariate copulas are also discussed with a major focus on their tail dependence structure. This study shows that certain types of Archimedean copula with the heavy tail dependence property are a reasonable framework to start in terms modeling insurance claim data both in the bivariate as well as in the case of multivariate domains as appropriate.

2. R. Prasad, Subrata Chakraborty and R. Sarma, *Impact of Distance Measures on Partition-based Clustering Method - An Empirical Investigation*, Published online 02/09/2022, International Journal of Information Technology (Scopus), ISSN 2249-3255, <https://doi.org/10.1007/s41870-022-01088-4>.

Abstract:

Distance-based clustering methods usually employ Euclidean distance as the proximity measure. This paper first identifies the best among some partition-based clustering methods using 17 artificial and 17 real-world datasets with Euclidean distance as the proximity measure. Next the impact of 24 different distance measures on the performance of the selected clustering method is evaluated by considering eight widely used validation indices to identify the most promising distance measure. Selection of the best distance measure is accomplished by computing an overall performance score based on the values of the eight validation criteria for each considered distance measure. The proposed IKMN+ algorithm, a modification of the incrementalKMN uses this best distance measure to obtain a partition-based clustering. Our findings revealed that IKNM+ could overcome the issue of initial centroid selection of k-means algorithm and provides good performance in clustering several real and synthetic datasets.

3. Seema Chettri, Bhanita Das, Imliyanga, P. J. Hazarika, *A Generalized Form of Power Transformation on Exponential Family of Distribution with Properties and Application*, Pak.j.stat.oper.res. Vol. 18 No.3 2022, pp. 511-535, DOI: <http://dx.doi.org/10.18187/pjsor.v18i3.3883>.

Abstract:

In this paper, we proposed a new generalized family of distribution namely new alpha power Exponential (NAPE) distribution based on the new alpha power transformation (NAPT) method by Elbatal et al. (2019).

Various statistical properties of the proposed distribution are obtained including moment, incomplete moment, conditional moment, probability weighted moments (PWMs), quantile function, residual and reversed residual lifetime function, stress-strength parameter, entropy and order statistics. The percentage point of NAPE distribution for some specific values of the parameters is also obtained. The method of maximum likelihood estimation (MLE) has been used for estimating the parameters of NAPE distribution. A simulation study has been performed to evaluate and execute the behavior of the estimated parameters for mean square errors (MSEs) and bias. Finally, the efficiency and flexibility of the new proposed model are illustrated by analyzing three real-life data sets.

Published Book Chapter(s)

1. Laba Handique, Subrata Chakraborty and M. Masoom Ali, *The Topp-Leone-G Power Series Distribution: Its Properties and Applications*, Chapter 9, in *G Families of Probability Distributions: Theory and Practices*, edited by M. Masoom Ali, Irfan Ali, Haitham Yousuf and Md. Ibrahim, CRC Press, pp. 132-143.

Conference/Workshop hosted

1. Coordinated one day National workshop on the Data Analysis in Different Domains, organized in collaboration with Indian Association for Productivity, Quality and Reliability (IAPQR), Kolkata on 25/09/2022.

Department of Anthropology

Journal Paper(s)

1. Maitreyee Sharma, *Pregnancy outcomes of adolescent and adult mothers belonging to Adi-Minyong tribal population of Arunachal Pradesh*, Journal of the Indian Anthropological Society, Volume 57, No. 2.

Abstract:

Adverse pregnancy outcomes and infant mortality caused due to adolescent pregnancy are major public health problems causing significant social repercussions. The incidence of adolescent child bearing is alarming in most of the North Eastern states of India. In the State of Arunachal Pradesh, more than one third of the girls became mother during adolescent period. This community based study aimed to compare pregnancy outcomes of adolescent and adult mothers belonging to Adi_Minyong tribe of West Siang district, Arunachal Pradesh. 345 participants belonging to the reproductive age group, who gave birth to at least one child, were recruited for the study. The participants were divided into four age categories – adolescent mothers (15-19 years), emerging adult mothers (20-24 years), young adult mothers (25-34 years) and middle-aged adult mothers (35-39 years) to understand pregnancy outcomes across maternal ages. Multinomial logistic regression model was applied to examine the determinants of pregnancy outcomes. Compared to young adult mothers, the adolescent and middle aged adult mothers showed higher odds for preterm delivery, small newborn at birth and antepartum hemorrhage. The adolescent mothers showed higher risk of prolonged labour, premature labour and obstructed labour compared to rest of the age categories. Neonates born to adolescent mothers showed higher odds for developing jaundice and pallor with fever, no suckling up to 24 hours from birth and swollen abdomen with not passing of stool for two consecutive days from birth. It appeared from the study that the adolescent and middle aged adult mothers have more adverse pregnancy outcomes than the mothers belonging to rest of the age categories.

Department of Pharmaceutical Sciences

Journal Paper(s)

1. Ezugwu JA, Okoro UC, Ezeokonkwo MA, Hariprasad KS, Rudrapal M, Ugwu DI, Gogoi N, Chetia D, Celik I, Ekoh OC, *Design, Synthesis, Molecular Docking, Molecular Dynamics and in-vivo Antimalarial Activity of New Dipeptide-Sulfonamides*, Chemistry Select, 2022, doi.org/10.1002/slct.202103908.

Abstract:

A new series of novel dipeptide sulfonamide analogues were designed, synthesized, and screened for their in silico studies and in vivo antimalarial activities. The synthesized compounds (50 mg/Kg) showed significant activity against *P. berghei* (NK65) with % inhibition values in (5.9 to 64.7 %) range in when compared with reference drug, artemisinin (66.7 %) in a four day suppressive assay. The in silico studies predicted favorable binding affinity of compounds with target protein residues with high dock score against *P. falciparum* falcipain 2 (FP-2) and falcipain 3 (FP-3) proteins in comparison with the reference ligands. The synthesized compounds showed druggable properties, and the predicted (absorption, distribution, metabolism, excretion and toxicities (ADMET) properties were within the acceptable limits. Molecular dynamics simulation study of the most active compound, 8 e was performed in order to further validate the stability of the protein-ligand complex and the protein-ligand interactions.

2. Zothantluanga JH, Abdalla M, Rudrapal M, Tian Q, Chetia D & Li J, *Computational Investigations for Identification of Bioactive Molecules from Baccaurea ramiflora and Bergenia ciliata as Inhibitors of SARS-CoV-2 Mpro*, Polycyclic Aromatic Compounds, 2022, DOI: 10.1080/10406638.2022.2046613.

Abstract:

In this study, a hybrid compound library of 72 phytocompounds from two antiviral medicinal plants (*Baccaurea ramiflora* and *Bergenia ciliata*) was computationally investigated for their inhibitory potential against SARS-CoV-2 Mpro. Molecular docking showed that 6-O-vanilloylicarisode B5, 6-O-vanilloylisotachioside, leucoanthocyanidin 4-(2-galloyl), and p-hydroxybenzoyl bergenin has good binding affinity for Mpro. However, p-hydroxybenzoyl bergenin did not bind at the catalytic cavity. The RMSD and RMSF data obtained from 100 ns MD simulations revealed stable protein–ligand complexes for 6-O-vanilloylisotachioside, leucoanthocyanidin 4-(2-galloyl). Ligand trajectory study found 6-O-vanilloylisotachioside and leucoanthocyanidin 4-(2-galloyl) to be stable. Studies on ligand interaction profile and timeline interaction profile showed that 6-O-vanilloylisotachioside and leucoanthocyanidin 4-(2-galloyl) interacted with HIS41–CYS145 dyad and other crucial amino acids of the catalytic site cavity during the entire 100 ns MD simulations. Molecular mechanics generalized born solvent accessibility binding free energy calculations, density functional theory analysis, quantitative structure–property relationship studies, and ADMET profiling of 6-O-vanilloylisotachioside and leucoanthocyanidin 4-(2-galloyl) supported the results generated by molecular docking and MD simulations studies. Based on the current computational investigations, we conclude that that 6-O-vanilloylisotachioside of *B. ramiflora* and leucoanthocyanidin 4-(2-galloyl) of *B. ciliata* are two potential inhibitors of SARS-CoV-2 Mpro that are worthy of further investigations.

3. Umar AK, Zothantluanga JH, Aswin K, Moulana S, Zubair MS, Lahlhenmawia, Rudrapal M, Chetia D, *Antiviral phytocompounds “ellagic acid” and “(+)-sesamin” of Bridelia retusa identified as potential inhibitors of SARS-CoV-2 3CL pro using extensive molecular docking, molecular dynamics simulation studies, binding free energy calculations, and bioactivity prediction*, Struct Chem, 2022, doi.org/10.1007/s11224-022-01959-3.

Abstract:

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has infected billions and has killed millions to date. Studies are being carried out to find therapeutic molecules that can potentially inhibit the replication of SARS-CoV-2. 3-chymotrypsin-like protease (3CL pro) involved in the polyprotein cleavage process is believed to be the key target for viral replication, and hence is an attractive target for the discovery of antiviral molecules. In the present study, we aimed to identify natural phytochemicals from *Bridelia retusa* as potential inhibitors of SARS-CoV-2 3CL pro (PDB ID: 6M2N) using in silico techniques. Molecular docking studies conducted with three different tools in triplicates revealed that ellagic acid (BR6) and (+)-sesamin (BR13) has better binding affinity than the co-crystal inhibitor “3WL” of 6M2N. BR6 and BR13 were found to have a high LD50 value with good bioavailability. 3WL, BR6, and BR13 bind to the same active binding site and interacted with the HIS41-CYS145 catalytic dyad including other crucial amino acids. Molecular dynamics simulation studies revealed stability of protein–ligand complexes as evidenced from root-mean-square deviations, root-mean-square fluctuations (RMSF), protein secondary structure elements, ligand-RMSF, protein–ligand contacts, ligand torsions, and ligand properties. BR6 (–22.3064 kcal/mol) and BR13 (–19.1274 kcal/mol) showed a low binding free energy value. The Bayesian statistical model revealed BR6 and BR13 as better protease inhibitors than 3WL. Moreover, BR6 and BR13 had already been reported to elicit antiviral activities. Therefore, we conclude that ellagic acid and (+)-sesamin as natural antiviral phytochemicals with inhibitory potential against SARS-CoV-2 3CL pro.

4. Patowary L, Borthakur MS, Zothantluanga JH, Chetia D, *Repurposing of FDA approved drugs having structural similarity to artemisinin against PfDHFR-TS through molecular docking and molecular dynamics simulation studies*, *Curr Trends Pharm Res*, 2022; 8 (2): 14-34.

Abstract:

Background: Malaria is caused by five species of Plasmodium parasites. It is responsible for causing more than 200 million people malaria positive and kills more than 400,000 people every year. Toxicity, price, bioavailability issues and emergence of drug resistance have doubled down the suitability of the drugs.

Objective: To tackle these problems, we aimed to identify FDA approved drugs having structural similarities to artemisinin and carried out in-silico based drug repurposing study against Plasmodium falciparum dihydrofolate reductase-thymidylate synthase (PfDHFR-TS).

Methods: Similarity search, molecular docking, visualisation of ligand interactions, bioactivity prediction, and molecular dynamics (MD) simulations techniques were used in the study. The co-crystal inhibitor (RJ1) of PfDHFR-TS was used as the positive control.

Results and Discussion: A total of 144 FDA approved drugs were found to have similar chemical structure with artemisinin. Molecular docking revealed 10 drugs with binding affinities higher than RJ1 and they were subjected to further studies. Tasosartan, exemestane, metolazone, ketazolam and cloxazolam were removed from the study from the initially selected 10 drugs as they showed poor ligand interactions and poor enzyme inhibitory potential. MD simulations (10ns) revealed that indapamide formed the most stable protein-ligand complex. Indapamide is a thiazide-like diuretic belonging to the class of sulfonamides. The drug has a high binding affinity for PfDHFR-TS, good ligand interactions, and good enzyme inhibitory potential.

Conclusion: We conclude that indapamide has the potential to be repurposed for PfDHFR-TS. Its scaffold may also be used to design and develop newer antimalarial agents.

5. Gogoi N, Chowdhury P, Goswami AK, Das A, Chetia D, Gogoi B, *Integrated computational approach towards repurposing of antimalarial drug against SARS-CoV-2 main protease*, *Struct Chem*, 2022; doi: 10.1007/s11224-022-01916-0.

Abstract:

Huge vaccination drives are underway around the world for the ongoing COVID-19 pandemic. However, the

search for antiviral drugs is equally crucial. As new drug discovery is a time-consuming process, repurposing of existing drugs or developing drug candidates against SARS-CoV-2 will make the process faster. Considering this, 63 approved and developing antimalarial compounds were selected to screen against main protease (Mpro) and papain-like protease (PLpro) of SARS-CoV-2 using in silico methods to find out possible new drug candidate(s). Out of 63 compounds, epoxomicin showed the best binding affinity against the Mpro with CDocker energy of - 57.511 kcal/mol without any toxic effect. This compound was further taken for molecular dynamic simulation study, where the Mpro-epoxomicin complex was found to be stable with binding free energy - 79.315 kcal/mol. The possible inhibitory potential of the selected compound was determined by 3D-QSAR analysis and found to be 0.4447 μM against SARS-CoV-2 Mpro. Finally, the structure activity relationship of the compound was analyzed and two fragments responsible for overall good binding affinity of the compound at the active site of Mpro were identified. This study suggests a safe antimalarial drug, namely epoxomicin, as a probable inhibitor of SARS-CoV-2 Mpro which needs further validation by in vitro/in vivo studies before clinical use.

6. Arpita Paul, Mohit Kumar, Parikshit Das, Nilayan Guha, Mithun Rudrapal*, Md. Kamaruz Zaman**. Drug repurposing– A search for novel therapy in the treatment of diabetic neuropathy; *Biomedicine & Pharmacotherapy*, 156 (2022) 113846. **Impact Factor = 7.419** [Elsevier, ISSN: 0753 – 3322]. <https://doi.org/10.1016/j.biopha.2022.113846>
7. **Ali Farak, Alom Shahnaz, Zaman Md. K.** Ethnobotany, phytochemistry and pharmacological properties of zanthoxylum nitidum: a systemic review. *World Journal of Pharmaceutical Research*, (2022), 11(11): 175-195. DOI: 10.20959/wjpr202211-24966 [ISSN: 2277 – 7105].
8. Paul A, **Zaman K.**, A comprehensive review on ethnobotany, nutritional values, phytochemistry and pharmacological attributes of ten potent Garcinia species of South-east Asia; *South African Journal of Botany* (2022) 148:39 – 59 (**Impact Factor= 3.111**). [ISSN: 0254 – 6299].

Published Book Chapter(s)

1. NilayanGuha^a, ArpitaPaul^a, JohirulIslam^b, Malay K.Das^c, **Md. KamaruzZaman^a**. “Phytosomes in Functional Cosmetics” in “Nanocosmeceuticals: Innovation, Application and Safety” by Malay K Das (Editor). *Academic Press* [Chapter-8], 2022. <https://doi.org/10.1016/B978-0-323-91077-4.00001-6>.
2. Arpita Paul, Nilayan Guha, **Md. Kamaruz Zaman**. “Nanotherapeutics of phytoantioxidants for CNS disorders”[Chapter-20] in “Phytoantioxidants and Nanotherapeutics” by Mithun Rudrapal (Editor), *Wiley*. [ISBN: 978-1-119-81177-0] ,



FACULTY OF EARTH SCIENCES

AND

ENERGY

Department of Petroleum Technology

Conference Paper(s)

1. Dhruvajyoti Neog, Amte Ayesha Siddiqua Rahman, *Study on the effect of temperature on reservoir rock wettability alteration: a review*, presented at the 37th National Convention of Chemical Engineers and National Seminar, held on 9th-10th September, 2022 at Raman Auditorium, ACT Campus, Anna University, Chennai, and proceedings published by The Institution of Engineers (India), Tamil Nadu State Centre in association with Centre for Energy Storage Technologies, Anna University.

Abstract:

Crude oil recovery from brown oil fields requires chemical Enhanced Oil Recovery methods. The conventional methods of crude oil recovery with primary and secondary measures are found incapable in most of the older oil fields. Thermal recovery is one of the most widely used EOR techniques. Experiments by many researchers have pointed out that an increase in reservoir temperature leads to a transition in rock wettability from an oil-wet to a water-wet state, which is usually considered a pre-requisite for an EOR process. The effect of temperature on wettability alteration is a result of several contributing parameters that cause fluid/rock and fluid/fluid interactions. Important properties include asphaltene deposition, oil composition, pH, saturation history, stability of thin water film above rock surface, initial water saturation, and clay content. Contact angle and relative permeability are some other physical properties that directly indicate the variation of wettability with temperature. In this paper, we present a literature review on how increasing temperatures alter these parameters in sandstones and carbonates and hence alter wettability. Moreover, we have listed from previous literature different schools of thought regarding temperature effects on wettability alteration in sandstones and carbonates reservoir rocks.



***FACULTY OF BIOLOGICAL
SCIENCES***

Department of Life Sciences

Journal Paper(s)

1. S. Bora, B. Saikia, D. S. Bora, P. Bhorali, *Expression analysis of defense response genes upon Sigatoka infection in Musa paradisiaca cultivar Kachkal, Indian J. Genetics and Plant Breeding*. 82(2):217-223 <https://doi.org/10.31742/IJGPB.82.2.1>.

Abstract:

The Sigatoka disease is an economically important disease of banana as it causes tremendous yield losses all over the world. In the present study, the defense related gene expression implicated in an incompatible interaction between a resistant banana cultivar Kachkal and the Sigatoka pathogen was analyzed. The initial changes in the expression of some selected defense related genes after infection by the invading pathogen *Pseudocercospora musae* were studied. Semi-quantitative RT-PCR studies indicated a basal level of expression of the selected genes prior to infection in the host plant, while upregulation of some of the important defense response genes coding for PR4, osmotin, LTP, UGPase and JAR1 was observed after the infection by *P. musae*. The findings of the study would be useful in designing a precise breeding strategy for genetic control of the disease in banana.

2. Borkataky, M., Nasrin, T and Bora, D. 2022. Diversity of Bryophytes in India- Special Reference to North-East India. *Ecology, Environment and Conservation*. 28 (August Suppl. Issue) : S212-S221.

Abstract:

Bryophytes, the first non-vascular embryophytes, are an interesting component of phytodiversity. NorthEast India can be considered as a hub of bryo-floristic species due to its suitable climatic condition but ecological research on bryo-flora is in infancy. Therefore, to assess the diversity and distribution of bryophytes, we conducted a literature review. From our study, about 23000 species of bryophytes are recorded in the world and nearly 2489 taxa are noted from India among which 340 species are endemic. In North-Eastern India, about 1786 of bryophytes are abundantly distributed and most of the endemic species have been recorded from Sikkim. Diversity of bryophytes acts as one of the important ecological indicators. A new vision of research has been provided by this review paper on the diversity of bryophytes and conservation of endemic species for future aspects.

3. Rajput, D., Saikia, L.R., Borkataky, M and Agarwalla, S. 2022. *Ageratum conyzoides* L.: In vitro antimicrobial, antioxidant and phytochemical study. *Ecology, Environment and Conservation*. 28 (August Suppl. Issue) : S255-S261.

Abstract:

Ageratum conyzoides L. (Asteraceae) is an aromatic weed. The weed has been known since time immemorial for its therapeutic properties and has been utilized for treatment of various ailments, such as burns and wounds, for antimicrobial properties, for many infectious conditions and bacterial infections, arthrosis, headaches and dyspnea, pneumonia, analgesic, anti-inflammatory, antiasthmatic, antispasmodic and haemostatic effects, stomach ailments, gynaecological diseases, leprosy and other skin diseases. A wide range of chemical compounds including alkaloids, coumarins, flavonoids, chromenes, benzofurans, sterols and terpenoids have been isolated from this species. Present study aimed at qualitative and quantitative phytochemical analysis of leaves of *A. conyzoides*.

Phytochemical analysis revealed the presence of tannin, alkaloids, flavonoids, phenols, glycosides, cardiac glycosides, reducing sugar and saponin and absence of anthraquinone, carotenoids and free anthraquinone in all the extracts varying quantities. The plant extracts exhibited the presence of a high amount of phenolics and flavonoid content which might be the key candidates for the antioxidant potential of the extract. The antibacterial activity of *A. conyzoides* was tested against seven bacteria.

Awards and Recognition

1. Patent certificate received by B. Khanikor and D. S. Bora: Patent No. 406107 dated 08.09.2022. Indian patent on “*Ocimum gratissimum* Essential oil based Biopesticide Formulation for the control of uzi fly *Exorista sorbillans* Wiedemann (Diptera:Tachinidae)”.



FACULTY OF SOCIAL SCIENCES

Department of History

Journal Paper(s)

1. Siddhartha Pait, *Revisiting Colonial Adventurism in the Unmapped Assam Frontier Hills and Beyond*, Nagfani (UGC Care listed Journal, ISSN-2321), September 2022.

2. Rashmi Rekha Bhuyan, *Divine or Cursed: Understanding the Conflict Syndrome in Royal Myths of Pre-modern Northeast India*, Fudan Journal of the Humanities and Social Sciences, Springer Nature

Volume: 15 (4), pp. 513-530, DOI: <https://doi.org/10.1007/s40647-022-00353-x>.

Abstract:

The transition from pre-state to state societies involves some ideological facets. In pre-modern states of India, especially from the post-Gupta period onwards, the ruling authorities tried to legitimize their position by claiming ancestry from Brahmanical deities. The ruling dynasties patronized Brahmanism, and, in return, the Brahmanas created myths of divine genealogy, which elevated the status of the former. The pre-modern states of northeast India were not an exception to it. The rulers of northeast India established Brahmanas and claimed divine genealogy with the help of myths created by the latter. Although they patronized Brahmanism, the ruling dynasties never entirely abandoned their tribal traditions from which they originated because most of their subjects remained outside the Brahmanical faith. Thus, the ruling authorities played the role of mediator between the two different traditions, which is reflected in the contradictory nature of the royal myths created through the agency of the Brahmanas. Focusing on the early kingdoms of Pragjyotisa-Kamarupa, the Ahoms, and the Koches of the medieval period, the paper attempts to explore the conflict syndromes in their royal myths and the polity formations of these pre-modern kingdoms. It helps us understand the particularity of political processes in the peripheral regions like northeast India.

Research Grants/Projects received

1. Dr. Kakoli Gogoi: *MOOCS Art Appreciation: Introduction to Indian Art*.

Department of Political Science

Journal Paper(s)

1. Obja Borah Hazarika, *The “China Factor” in the Northeast Component of India’s Act East Policy: Implications for Security, Connectivity, Commerce*, International Journal of China Studies, 13(1), pp. 63-78, ISSN 2180-3250.

Abstract:

The Act East Policy of India, earlier known as the Look East Policy, was launched in the early 1990s to reach out to the neighbours of the country to its east and beyond. The policy has also acquired a prominent Northeast India component to it. The Northeast of India – comprising of eight states – Assam, Mizoram, Manipur, Tripura, Meghalaya, Arunachal Pradesh and Sikkim, is presently a landlocked region ensconced, barring a small section, between Bhutan, China, Bangladesh, Myanmar and Nepal. This paper is on the ‘China factor’ in the Act East Policy with special regard to the aspects of this policy covering the Northeast of India. It is argued here that China impacts the Northeast India component of the Act East Policy in various ways and that the aspects of

security threats cast a shadow over the implementation and realization of this policy especially those pertaining to sub-regionalism and infrastructure projects. It is also seen that the provincial governments of India in the Northeast are attempting to carve a space for themselves on matters pertaining to neighbouring countries including China. Furthermore, it is noted that China also reacts to India's actions or inactions in the Northeast under the policy.

2. Obja Borah Hazarika, *Reasons and Reactions to the Galwan Clash: An Indian Perspective*, Journal of Territorial and Maritime Studies, 4 (9), pp. 83-101, ISSN 2288-6834.

Abstract:

India and China have been locked in a border standoff since May 2020. Even after 14 rounds of border talks between the two militaries, a resolution is nowhere in sight. This paper aims to outline how the events unfolded, track reactions from countries world-wide, and analyze the Chinese rationale behind the attacks. Design, Methodology, Approach—The paper follows an inductive form of reasoning and moves from the particular to the general. Statements on the digital platform from heads of state and important people in positions of power from both sides are taken cognizance of and analyzed. Both primary and secondary literature sources are looked into to outline how the crisis unfolded. Findings—The Galwan crisis is a watershed moment in the history of India-China relations and has implications for regional and global stability. As China, owing to its economic and political clout in the international arena, continues rising and posing challenges for the liberal, democratic Western world, countries like India have to take cognizance of the new realities around China and accordingly tweak their foreign policies in accordance. For example, for India, it becomes essential to understand how it can recalibrate its relationship with China by taking note of the countries that stood by it during such a crisis with China.

Conference Paper(s)

1. Amrita Pritam Gogoi, *Giving Memory a Body: Documenting Loss, Memory and the Experience of Operation All Clear of Assam*, presented at the National Seminar on Conflict and Coping in Northeast India: The Role of Memory, organized by NESRC, Guwahati.
2. Obja Borah Hazarika, *The Rise of Digital Diplomacy: Exploring the Emerging Trends in India's Twiplomacy*, presented at the International Conference organised by St. Joseph's College, Darjeeling on 15-16.09.2022.

Abstract:

The conduct of relations between states, especially those encompassing foreign policies of political entities, has been known to broadly exemplify diplomacy. With time, diplomacy has undergone transformation in the means through which it is conducted. This transformation is underlined with changes in technology. There is a contention that the advent of social media has led to the emergence of digital diplomacy where information and communication technologies (ICTs) have enabled connectivity that is global in nature. Social media it is contended is being used for a range of diplomatic activities including and not limited to management of information, public diplomacy, negotiations and crisis management. It also allows for a two-way communication between the diplomats and the target audience. The earlier version of digital diplomacy entailed the use of electronic mail by high officials to other state heads. With the advent and proliferation of the use of social media sites including but not limited to Facebook and microblogging sites such as Twitter, these have become a common platform for statespersons to air their views and discharge their functions. This paper will provide an overview of digital diplomacy and will state some examples of communication of leaders on foreign policy through social media. It will attempt to examine the case of India's digital diplomacy by concentrating on Twiplomacy practiced by a few leaders of foreign policy, especially from the ministry of external affairs of the country. The paper attempts to enable the contextualization of the use of social media by leaders to pursue foreign policy and will bring to the fore the issues which such leaders state in microblogging sites and the trends

of twiplomacy being formed by their use of microblogging sites. The motivations behind the use of social media will also be addressed to put into perspective the reasons why leaders have taken to microblogging sites with such vigour in the contemporary times.

3. Objā Borah Hazarika, *Social Responsibility and Community Engagement in Higher Education Institutions: Policies and Practices*, presented at the National Workshop organised by the National Institute of Educational Planning and Administration on 4th and 5th August, 2022.

Published Book Chapters:

1. Dolly Phukon, *Gender Equality and Women Empowerment: An analysis of stereotype and its deconstruction*, in *Gender State and Society*, edited by Sabyasachi Mahanta, DVS Publisher, 2022, ISBN: 978-93-85839-69-6, pp. 38-49.
2. Dibyajyoti Dutta, "Frailty (Not) Thy Name is Women, in *Gender State and Society*, edited by Sabyasachi Mahanta, DVS Publisher, 2022, ISBN: 978-93-85839-69-6, pp. 63-72.
3. Monoj Kumar Nath, *MDGs and Performance of Assam in Gender Equality and Women Empowerment*, in *Gender State and Society*, edited by Sabyasachi Mahanta, DVS Publisher, 2022, ISBN: 978-93-85839-69-6, pp. 73-85.
4. Objā Borah Hazarika, *Gender bias in Artificial Intelligence: the Perils of undiversified Data sets*, in *Gender State and Society*, edited by Sabyasachi Mahanta, DVS Publisher, 2022, ISBN: 978-93-85839-69-6, pp. 174-189.
5. Kaustubh Deka, *Youth Activism*, in *Routledge Companion to Northeast India*, edited by Jelle J. P. Wouters and Tanka B. Subba, Routledge, ISBN : 978100328554, 491-496.

Conference/Workshop hosted

1. Name of the Conference: 'Youth in Contemporary India', held on 8-9 September, 2022
Convenor : Dr. Kaustubh Deka, Assistant Prof, Department of Political Science, Dibrugarh University in collaboration with the Centre for North East Studies and Policy Research, Jamia Milia Islamia, New Delhi. (Number of Participants: 24; Number of Papers Presented: 20).

Department of Sociology

Journal Paper(s)

1. Uasona Sarma, *Food Practices and Beliefs During Pregnancy and Post-partum Among the Tribal Women of Assam: A Study Among the Five Tribes of Margherita Subdivision of Tinsukia District, Assam*, *Journal of the Anthropological Survey of India*, Sage Publication; Vol. 71 Issue 1 10 August, 2022, <https://journals.sagepub.com/doi/abs/10.1177/2277436X221109370>.

Awards and Recognition received by Faculty:

1. Ph.D awarded to Dr. Kuheli Das, from Jawaharlal Nehru University, New Delhi for the dissertation titled *Experiencing the Repercussions of Ethnic Conflict: A Study among Bodo and Bengali Muslims of Chirang District, Assam*, notified on 12th June, 2022.



FACULTY OF EDUCATION

Centre for Studies in Physical Education and Sports

Journal Paper(s)

1. Siddhartha Sarma, *Analytical Study on Anxiety of the Students of Dibrugarh University*, Insight: An International Multilingual Journal for Arts and Humanities, Volume No. 2, September 2022, ISSN No. 2582-8002.

Abstract:

The aim of the study was to analysis on anxiety of the students of Dibrugarh University. For the purpose ninety (N=90) respondent were selected. Thirty (30) respondents from each different stream as Arts, Science and Commerce were collected purposively. To measure the selection variables the standard questionnaire (STAI) was used and the reliability coefficient of 0.86. (Spielberger, 1966). The present study was hypothesized that there would be no significance difference of anxiety on the students of Dibrugarh University. Descriptive statistics and to find out the significant difference the ANOVA were used to critical analysis the data. The result of the present study showed that there was no significance difference found because F-ratio of trait anxiety and state anxiety was 0.51 and 0.85 which was smaller than the critical value. The study indicated that there was no significance difference on Anxiety among of the students of Dibrugarh University. It was clear from the findings that the Anxiety levels of each different stream students of Dibrugarh University were same.

Keywords: Anxiety, Trait and State

Conference Paper(s)

1. Mantu Baro, Youth Sports Environment in Assam, presented at the Three Day International Conference on Emerging Trends of Physical Education and Sports Science (ICETPESS), held at the Department of Physical Education and Sports Science, Manipur University, Canchipur, Imphal, Manipur, proceedings published as Emerging Trends of Physical Education and Sports Science (ICETPESS), edited by Laishrarm Santosh Singh, International Sunmarg Publishers and Distributors, August 2022, ISBN: 978-93-82606-09-3.

Abstract:

In recent times though the sports become a profession and officially frowned on but still enjoyed by common people in villages. In context to Assam, the sports do not get the professionalism completely in reality; sports are still remaining as a source of leisure and means of fitness partially. Because most of people not engaging themselves in sports and finding difficult to consider sports as profession. In the present society most of indigenous sports as well as recreational sports are eliminating day by day. As a result the proper growth and development is not occurring to children. Youth sports is any sports where athletes or players are generally younger than adult i.e. 6 to 18 years of age. Youth sports include institutional sports in the primary to secondary level and other informal or organized sports within any age group less than 18 to 21 years of age. The main aim of any sports person is to achieve the social recognition as well as professionalism i.e. Profession for live his/her life. The sports participation or sports competition can also reform the society. Hence, the mentioned type of competitions have important role in improvement of youth sports environment and sports performance. Hence in the present context especially in special reference to Assam as there are ample prospects in physical education and sports, there are urgent needs to prepare the physical education and sports policy to introduce physical education and sports subject in school and college curriculum and to have the games and sports competition in various level in scientific way. Despite of the various issues and challenges in youth sports few strong aspects of youth sports is millennium of children/youth are participating, playing and enjoying sports and variety events are available in many sports which are required proper implementation and monitoring.

Key Words: Youth Sports Environment.



***FACULTY OF HUMANITIES AND
LAW***

Department of English

Journal Paper(s)

1. Lakhipriya Gogoi, *Bodies in Transit: Women, War and Violence in Select Fiction from Nepal*, Journal of International Women's Studies, Volume 24 Issue 6, Special Issue on Violence and Resistance: Narratives of Women in South Asia, October 2022, ISSN 1539-8706, <https://vc.bridgew.edu/jiws/vol24/iss6/15>.
2. Lakhipriya Gogoi, *Subversive Narratives of Borders and Nations: A Reading of Debendranath Acharya's Jangam and Amitav Ghosh's The Glass Palace*, Society and Culture in South Asia, Volume 8 Issue 2, pp. 219-239, 16 June, 2022, ISSN 2398617, <https://doi.org/10.1177/23938617221098261>.
3. Meena Sharma, *Food in the Literary Text: A Reading of Jahnvi Baruah's Undertow*, Teresian Journal of English Studies, Volume 14 Issue 2, ISSN 0975-6302.
4. Luku Morang, Meena Sharma, *Representing Women from Northeast India: A Semiotic Analysis of Select Bollywood Movies*, Drishti: The Sight, Volume 11 Issue 1, UGC CARE listed, ISSN 2319-8281.

Book Chapter(s)

1. Lakhipriya Gogoi, *Collective Identity and Political Narrative: The Freedom Struggle in Select Women's Self Narration from Assam*, in Gender State and Society, edited by Sabyasachi Mahanta, DVS Publisher, 2022, ISBN: 978-93-85839-69-6.
2. Ritushmita Sharma, *Spectres from the Past: Reading the Repressed fragments of "the Personal and Historical" in Toni Morrison's Beloved*, in Literary Resonance, edited by Sikhamoni Gogoi and Hasnahana Gogoi, Purbayon Publication, ISBN: 978-93-93881-54-0, pp. 36-44.



FACULTY OF COMMERCE
AND
MANAGEMENT SCIENCE

Department of Commerce

Journal Paper(s)

1. Nazreen Parveen Ali, Ashit Saha, *Market Efficiency of Indian Capital Market: An Analysis of Impact of Union Budget Speech on Indian Stock Market*, Vanijya, Volume 30.

Abstract:

Each year, anticipation of announcements in the Union stimulate the market players to boost transactions in the stock market. Any news which is related to economy, political events, economic announcements, pandemic situations and international turmoil between countries could have impact on dynamics of stock market. The objectives of the study is to analyze the semi strong efficiency of the Indian Stock Market by tracing the response of trading activity and volatility around Union Budget Announcement for very short term (7 days), short term (15 days), medium term (31 days) & long term (61 days) event windows uniformly distributed around the date of Union Budget Announcement. Event study using the standard market model is used to obtain the AARs and CAARs. Runs test for randomness, parametric t test, non parametric wilcoxin rank sign test and ARCH/GARCH model are used to test the statistical significance of the dynamics in response to the event. It was observed that the Indian stock market is not efficient in its semi strong form around Union Budget Announcements as impact is statistically significant under the parameters of the study.

Keywords: Stock market, Union Budget Sensex, Event Study, AARs, CAARs.

2. Porag Pachoni, Ashit Saha, *Examining Financial Performance of Paper Mills of Assam through Altman Z Score Model - A Study From Industrial Sickness Perspective*, Vanijya, Volume 30.

Abstract:

One of the notable causes of Industrial sickness is poor financial performance. The different financial parameters provide indication of sickness of company's financial status. This is the responsibility of the financial manager, how to deal with the situation. The prudent financial management can reduce the risk of financial failure at the early stage. Therefore, it is necessary for early detection and prediction of industrial sickness through the financial ratios and models. The present study examines the past financial performance of Hindustan Paper Corporation Ltd (HPC) through Z score by E.I.Altman. The findings of the study reveals that the concerned company was in gray zone or zone of ignorance from 2002-03 to 2008-09 and again in 2010-11. The company falls into bankruptcy situation in 2009-10 and 2011-12 to 2015-16. The results of the study reveals that the poor financial performance of HPC Ltd is the one of the contributing factors of causes of sickness.

Keywords: Industrial Sickness, HPC, Paper Mill, Financial Performance, Altman Z score.

3. Tapash Kashyap, Kumud Chandra Goswami, *A Study on the Usage Pattern of Digital Wallet*, Vanijya, Volume 30.

Abstract:

Digital wallet has become a synonym to digital transactions nowadays. With the emergence of UPI coupled with thrust by Government towards digital India initiative, cashless transactions are rapidly increasing over cash transactions. The pandemic further fuelled this growth towards new peak. Therefore, the researchers through the present study attempted to highlight the transition of traditional transactions to digital transactions by

primarily focusing on the usage pattern of digital wallet users. From the study it becomes evident that with the increasing adoption of digital wallets, the customers are becoming frequent users of digital wallet and they are making use of digital wallet for various purposes like money transfer, service recharges, etc.

Keywords: UPI, Cashless Transactions, Digital India, Usage Pattern.

4. Parag Gogoi, Seema S. Singha, *Management thoughts in Assamese Sayings of DAK with Reference to Life Management*, SSRG International Journal of Economics and Management Studies, Volume 9 (6).

Abstract:

In Assam, the Assamese sayings or maxims of Dak (popularly called in Assamese as Dakar Bachan) are an asymmetrical source of traditional knowledge in the Assamese society. It is one of the richest sources of oral literature in Assamese. The study aimed to explore whether any management thoughts exist in the Assamese sayings of Dak. The study is an attempt to contextualize the Assamese sayings of Dak from the management perspective and to explore the management thoughts from the sayings in the Assamese language for the management of life and how far they would regulate the life of humans beings in their thoughts and decision making. The study concentrates on the Assamese sayings of Dak, which is spoken in the Assamese language. The study is both interpretative and exploratory. The data have been collected from secondary sources, i.e., ancient texts, archives, relevant books written by eminent Assamese authors, literature by scholars, research papers and journals, and contents from the web and print media. In this study, the researcher has selected some Assamese sayings of Dak, mostly related to life management. Most of these Dak's sayings are educative. Management thoughts from the Assamese sayings of Dak presented in this study provide us with a new way of defining the idea of management. The study addresses that management thought is hidden in the Assamese saying of Dak.

Keywords: Management thoughts, Assamese sayings of Dak, life management.

5. Pallavi Kashyap, Seema S. Singha, *Tourist Satisfaction with Special Reference to Sivasagar District of Assam*, Academia, Volume 6 (1).

Abstract:

Tourism industry has gained wide popularity and profitability in the world recently. It is one of the fastest growing service industry and economically very important in the present- day situation. It has immense scope for the generation of income and employment. The district of Sivasagar in Assam has immense potentiality for the development of tourism. It is the treasure house of the natural beauty with flora and fauna, tea gardens, historical monuments, pilgrimage centres, culture, festivals etc. All these together has the potential to make the study area, Sivasagar one of the most sought after destinations for the tourists. The study is an effort to highlight the demographic profile and travel details of the tourists visiting Sivasagar. It is an attempt to analyse the satisfaction of tourists visiting Sivasagar with identified destination factors namely; attractions, accommodation, transportation, travel services/tour guidance, supporting infrastructure, other factors. The result was drawn from questionnaire survey of 342 tourists who visited the study area. Policy makers and the concerned authorities will be able to collect enough inputs and data which could be better utilized while framing policies for the development of tourism in Sivasagar.

Keywords: Tourist, tourism, satisfaction, destination factors.

6. Debanuj Khound, Bipasha Chetiya Barua, *Analysis of Select Indian E-Commerce Websites Using Paired Similarity Index*, PARIPEX - INDIAN JOURNAL OF RESEARCH, Volume 11 (7).

Abstract:

Online shopping industry is one of the fastest growing industries which has expanded rapidly due to the ever increasing access to internet and rising disposable income levels. It is observed that new age consumers are indulging in impulsive purchase of products in the online shopping website. The information content, features, web design etc. in the websites plays a significant role in drawing shoppers. In this paper the information and features provided in some popular e-commerce websites are analysed using binary representation and developing a similarity index. A Paired Similarity Index (PSI) is created to measure the similarity of information and features between websites through pairs of observations. The study is comprised of selected e-commerce websites, operating in India across a different product categories. This comparison will enable to rank websites based on the information and features provided.

Keywords: online shopping, website comparison, paired similarity index, e-commerce.

7. Bishakha Chetia, *Seeking Opinion Leadership for Purchasing Sports Apparel: A Comparative Study on the National, State and District Level Players of Assam*, Vanijya, Volume 30.

Abstract:

Opinion leadership in many markets is the single most potent factor causing a purchase decision, making them a vital target market segment (Van Der Merwe & Van Heerden, 2009). They exist in various fields and social levels. In the case of sports, coaches act as opinion leaders for the players they train. They advise the players on different aspects, ranging from eating, exercise, materials and brands to consume. In this paper, the researcher attempts to check if there lay a difference in opinion seeking by the national, state and district level players of Assam for purchasing sports apparel. For this purpose, primary data was collected from 564 players using a questionnaire. Parametric tests, namely correlation and regression analysis, are conducted to verify the hypotheses used for the study. The study finds a strong positive association between 'coach's opinion' and the 'number of sports products purchased by the national, state and district level players'. Further, if we increase the 'number of sports apparel purchased by after seeking the opinion of the coach' by one unit, the 'number of sports apparel purchased by the national, state and district level players' will increase by 0.880 units, 0.929 units and 0.893 units respectively.

Keywords: opinion leader, opinion seeking, sports coaches, sports players, sports apparel.

Conference Paper(s)

1. Bishakha Chetia, *Gender Inequality in Sports: An Analysis of the Demographic and Economic Profiles of the Coaches of Assam*, presented at International Conference (Hybrid Mode) on Innovative Practices in Commerce Management, Humanities & Technology (IPCMHT) 2022, held at Patrician College of Arts and Science, Chennai on 25-26th August, 2022.

Abstract:

Gender inequality adversely affects India's sex ratio, especially women's health, educational attainment and economic conditions. Although the Constitution of India grants equal rights to men and women through its Fundamental Rights of Equality, gender disparities remain. This study is an attempt to identify the gender disparities in the field of sports which harm the overall development of the economy. The study finds inequality in education, income, experience and lesser participation in economic activities responsible for gender inequality in sports. The study also tries to suggest measures to remove the gender disparities that are prevalent

in sports.

Keywords: gender inequality, sports, coaches, sustainable development.

2. Bishakha Chetia, Gender Disparity in Sports: An Analysis of the Sports Coaching Scenario of Assam, presented at the 5th North East India Commerce and Management Association (NEICMA) National Conference on Atmanirbhar Bharat, The Reclamation, Reformation and Resilience, held at Mariani College, Assam on 23-24th September, 2022.

Abstract:

Gender inequality adversely affects India's sex ratio, especially women's health, educational attainment and economic conditions. Although the Constitution of India grants equal rights to men and women through its Fundamental Rights of Equality, gender disparities remain. This study is an attempt to identify the gender disparities in the field of sports which harm the overall development of the economy. The study finds inequality in education, income, experience and lesser participation in economic activities responsible for gender inequality in sports. The study also tries to suggest measures to remove the gender disparities that are prevalent in sports.

Keywords: gender inequality, sports, coaches, sustainable development.

3. Barsha Kalita, Pranjal Pratim Dutta, *Export Prospects and Performance of APEDA products: A study in the state of Assam*, presented at the 5th North East India Commerce and Management Association (NEICMA) National Conference on Atmanirbhar Bharat, The Reclamation, Reformation and Resilience, held at Mariani College, Assam on 23-24th September, 2022.

Abstract:

After the launch of the Act East Policy, new opportunities in regard to exporting business have been enlarged in the state of Assam and many export houses are being registered since 2015. Assam records the highest exporting value amongst the Northeast region and being rich in agricultural produces, the government is emphasizing more on exporting agricultural products of the state. In the present study, the researcher has dissimilated the export prospect of the state in regard to agricultural products and for the said purpose, APEDA (Agricultural and Processed Food Products Export Development Authority) products that includes all the agricultural and allied products along with livestock products have been considered. The study has determined the comparative advantage using the Revealed Comparative Advantage Index of agricultural products of the state in the country's agricultural export basket and showed the export-trajectory of the state using graphs and calculated Compound Annual Growth Rate, Average Annual Growth Rate of the value and quantity of exports. It is revealed in the study that the agricultural produce has the advantage in the export of the country and growth in export has shown a positive trend post the launching of Act East Policy.

Keywords: Export, Growth, Revealed Comparative Advantage, Act East Policy, APEDA.

Published Book Chapter(s)

1. Bishakha Chetia, *Seeking Coach's Opinion for Purchasing Sports Equipment: A study on the National, State and District Level Players of Assam*, in BizQuest: Insights into Commerce, Economy and Society, edited by Samrat Bharadwaj and Prerana Sarma, Eureka Publications, ISBN: 978-93-91260-42-2, pp. 79-90.

Centre for Management Studies

Journal Paper(s)

1. Prakrit Saikia, Himadri Barman, *A Systematic Analysis of Content Structural Efficiency for Estimating Higher Educational Institution Engagement Over Facebook*, International Journal of Online Marketing, 12.

Abstract:

The purpose of this research article is to examine the Facebook content themes and structural efficiency of higher education institutions in order to understand how these factors influence engagement. The sample consisted of 4,703 Facebook posts from the top ten most popular Indian and global higher education institution pages. The platform engagement options were used to categorize audience reactions, while structural attributes were examined in accordance with applicable theory using a negative binomial regression model. Factor analysis and descriptive metrics were used to evaluate theme efficacy. The findings highlight the significance of developing a comprehensive assessment of content structural efficiency. The paper presents a number of evidence-based recommendations for projecting and estimating content performance. This study adds to the body of knowledge by first merging the content subject with its structural parts. Previously, the content theme was thought to be a qualitative unit.

Conference Paper(s)

1. Himadri Barman, *Information Deprivation - A Curse for the Have Nots*, presented at the National Seminar on Measures of Socio-economic Deprivation, held at Assam University, Silchar on March 24 – 25, 2022, proceedings of the National Seminar on Measures of Socio-economic Deprivation; Prof. Dibyojyoti Bhattacharjee; Department of Statistics, Assam University.

Abstract:

This paper discusses the issue of Information Deprivation in the present-day information age and argues that it has become a curse for the Have Nots. It talks about what can be done to overcome the challenges of information deprivation among the poor.