

SCHOOL OF BIOTECHNOLOGY

NEWSLETTER | JANUARY 2018



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CONFERENCE AT MANIPAL

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The coming of the New Year 2018 brings with it the aspirations of a bright and successful academic semester. There is a sense of distinct optimism in the air catalyzed by the recent success of the School of Biotechnology in several different spheres of activity in the academic and research arenas.

From playing a pivotal role in hosting the Swadeshi Science Congress 2017 at the Amritapuri Campus, to having faculty and research fellows giving invited keynote lectures at International conferences, to having a respectable number of publications in peer-reviewed high impact factor journals, to having research scholars qualify for the National Research fellowships (CSIR), with several students ranked in the top 100 ranks nationally to the absolute cherry on the cake - a faculty member being awarded the very prestigious Ramalingaswami Re-entry Fellowship for scientists returning to India after a research stint overseas - the School of Biotechnology did well to win these laurels and more.

Let us continue to 'floor the pedal' as we strive towards excellence and the pursuit of our goals with Amma's grace in the semester and well into the future.



DR. BIPIN NAIR
DEAN, SCHOOL OF
BIOTECHNOLOGY

FROM NEURONS, CIRCUITS TO MODELS AND DEVICES

BIOCOMPNEURO'17, ICACCI INTERNATIONAL CONFERENCE, MANIPAL



An international workshop and paper session on bio inspired modeling and computational neuroscience was organized at the International Conference on Advances in Computing, Communications and Informatics (ICACCI), conducted at Manipal University, Karnataka, India, on 14th September, 2017. The workshop titled "From neurons, circuits to models and devices" (BioCompNeuro'17), was co-affiliated with Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017). The workshop was organised by Dr. Shyam Diwakar, Director, Computational Neuroscience and Neurophysiology, Amritapuri, and Associate Professor, School of Biotechnology, Amritapuri.

International Conference on Advances in Computing, Communications and Informatics (ICACCI) provides an international forum for the exchange of ideas among interested researchers, students, developers, and practitioners in the areas of computing, communications, and informatics.



Dr. Aditya Murthy, Convenor, Center for Neuroscience, Indian Institute of Science, was the key speaker of the event and he addressed "Brain Mechanisms of Motor Control". Dr. Srinivasa Chakravarthy, IIT Madras, spoke on "Understanding the Parkinsonian Brain through Computational Modeling" as part of his keynote. Dr. Shyam Diwakar spoke on "Computational Neuroscience of cerebellum and interconnected circuits". Dr. Bipin Nair, Dean, Amrita School of Biotechnology, gave a conference plenary talk on "Cost-Effective Device and Cloud Enabled Smart Solutions for Diabetes Care". The plenary talk addressed the Amrita Vishwa Vidyapeetham patents and innovations on glucose meters and insulin pumps.



The students and researchers from Computational Neuroscience & Neurophysiology presented ten papers at the conference and workshop. Their studies were on cerebellum, basal ganglia and network activity modeling. The students from Amrita School of Biotechnology and Amrita School of Business also presented papers in this conference. Faculty members Mr. Nidheesh M., Assistant

Cost-Effective Device and Cloud Enabled Smart Solutions for Diabetes Care

PLENARY TALK BY DR. BIPIN NAIR AT ICACCI

Diabetes mellitus is a public health problem affecting 65 million people in India with another 21 million people probably being in the prediabetic stage. The healthcare infrastructure for diabetes care in India, especially for the middle and low income population is extremely fragmented. With accessibility, availability and affordability being the issues of optimal healthcare today, there is an acute need for proactive low cost intelligent systems for diabetes care.

The present smart solution being developed involves a totally indigenous, automated insulin pump that is a dual micro-controller based compact programmable drug infusion system. This US patented cost-effective system could be highly effective for administering insulin therapy, which is the gold standard for diabetes care. The smart solution also comprises an unique and cost-effective, US patented non-enzymatic glucose monitoring system which involves a glucometer, connected devices, mobility, cloud and helpline based ecosystem.

In a mutually beneficial collaboration with Wipro Technologies, Amrita University aims to develop this smart solution with the goal to provide low cost quality care especially for the economically challenged diabetic population across the globe.

CONGRATULATIONS!

to our students who qualified in the Top 100 ranks in National CSIR, 2017

- Nitasha Menon
- Meera Venugopal
- Jeswin Joseph
- Nidhi D.
- Anupama Sekhar
- Anila Gopinathan



Professor, School of Biotechnology, Amritapuri, and Ms. Asha Vijayan, Assistant Professor, School of Biotechnology, Amritapuri, also presented their papers. The papers will be listed on IEEE Xplore and will be Scopus-listed. The papers of the students are from the Amrita Vishwa Vidyapeetham projects, funded by Cognitive Science Research Initiative of Department of Science and Technology and Ministry of Human Resource Development's Virtual Labs project.



SWADESHI SCIENCE CONGRESS

Hosted by Amrita, Amritapuri Campus

Amrita Vishwa Vidyapeetham, Amritapuri Campus, hosted the 27th Swadeshi Science Congress with the focal theme of "Science and Technology are the Key Drivers to Development", from 7th to 9th November, 2017. The dignitaries who attended the event included Dr. M. D. Nair, Chairman, Swadeshi Science Congress; Dr. Dallis Teresa Miranda, President, Swadeshi Science Movement (SSM) and Sri. Suresh Gopi Member of Parliament (Rajya Sabha). The conference provided a platform for 180 research institutes to present around 303 treatises, which also included 14 technical sessions and discussions.

The programs on the first day began with the welcome address by Dr. Bipin Nair, Dean, Amrita School of Biotechnology, Amritapuri, and the presidential address by Swami Amritageetananda Puri, Mata Amritandamayi Math. Dr. Dallis Teresa Miranda gave a brief introduction to the 27th SSM. The inaugural address was given by Dr. M. D. Nair, Chairman, 27th Swadeshi Science Congress. Later, Swami Amritageetananda Puri released the book of Abstracts and Dr. Bipin Nair received the first copy. Next, the event saw the release of two booklets written by Sri. Karimkunnam Ramachandran. The first booklet, "Nadi Samrakshanam Oru Samasya", was released by Dr. M. D. Nair and Dr. Jyothi S. N., Principal, Amrita School of Engineering, Amritapuri, received the first copy. Dr. V. M. Nandakumaran, Principal, Amrita School of Arts and Sciences, Amritapuri, released the second booklet, "Ecosan Toilet" and Dr. Sudarslal S., Associate Professor, Amrita School of Biotechnology, Amritapuri, received it. Dr. A. R. S. Menon, Secretary, SSM, delivered the vote of thanks. The participants presented their papers on the second and third day of the conference with presentation of papers and E-posters in the fields of Life Sciences, Agriculture, Veterinary, Fisheries, Mathematics, Physical and Chemical Sciences, Computer Engineering, Electronic Engineering, Disaster Management, Health Sciences, Environmental Sciences and Science Education in India.

Faculty from Amrita School of Biotechnology presented their research, including invited talks from Dr. Sanjay Pal on "Biocontrol of infection & smell in wastewater for use in agriculture & aquaculture" and Dr. Sudarslal on "Exploring the Venom of Malabar Pit Viper: Proteomics and Functional Studies". The best poster in the Life Sciences track session was awarded to Mr. M Ajith on "Bacterial membrane filters as lytics broadcasting system (LBS), An exploratory study".

The Swadeshi Science Movement- Kerala, is a popular science movement dedicated for the overall development of our country through the intervention

of science and technology. It has been functioning in the state of Kerala since 1989, focusing on science popularization for social development. Swadeshi Science Movement aims at fostering a multidisciplinary approach to local problems and the promotion of India's scientific heritage. It has been bestowed with two prestigious National Awards by Government of India: National Award for Outstanding efforts in Science and Technology Communication (2006- 07) by Ministry of Science and Technology, and Jawaharlal Nehru Prize (2005-06) for science popularization by Hon'ble Prime Minister. ~~~



Dr. Bipin Nair delivering the welcome address



The audience assembled in Acharya Hall, Amritapuri Campus



Sri. Suresh Gopi (left) with Dr. Bipin Nair (right)



ISWWM 2017 conference participants from the Sanitation Biotechnology group (from left: Drisy T., Archana P.V., Ajith Madhavan, Pradeesh Babu, Dr. Sanjay Pal, and Asha Sundaresh)

Awards for Sanitation Biotechnology Group at International Conference on "Innovative Strategies for Sustainable Water Management" (ISWWM 2017)

A team of 10 delegates from the Sanitation Biotechnology research group of the School of Biotechnology participated in a conference held at Lovely Professional University (LPU), Punjab, from 17th to 19th, of November, 2017 as part of the Indo-Canada Project funded by DBT and IC-Impacts (Canada) of which Sanitation Biotechnology group is one partner.

They presented five posters, two oral presentations and two lead talks. Dr. Sanjay Pal, Co-Convenor of the conference spoke on "Biocontrol of infection and smell in wastewater for use in agriculture and aquaculture" and Ajith Madhavan gave his talk on "Chitin synthase inhibitors from plants". The Ph.D. students in particular

showed a stellar show in the conference by delivering five posters and two talks. Archana Palillam Veedu received the best poster award for her presentation on "Activity of probiotic strains against enteric pathogens" and Pradeesh Babu was presented with a travel grant award in recognition of his abstract on "Resazurin based redox dye as an indicator for monitoring wastewater biological activity". All nine abstracts submitted by the Sanitation Biotechnology group are being considered for the full paper submission in the Scopus indexed journal "Pollution Research" ~~~



RESEARCH HIGHLIGHTS

@ AMRITA
SCHOOL OF
BIOTECHNOLOGY



Dr. Nandita Mishra



Divya Nedungadi



Anupama Binoy

Endogenous H₂S tracking Fluorescent Probe: a promising biomarker for cancer cells

A cancer labelling fluorescent probe was designed by Dr. Sankarprasad Bhuniya, Research Professor at Amrita Center for Industrial Research & Innovation and Amrita Center for Excellence in Advanced Materials and Green Technologies, Amrita School of Engineering, Coimbatore, along with Nithya Velusamy and Kondapa Naidu Bobba, Dr. Nandita Mishra, Assistant Professor, Amrita School of Biotechnology and PhD students Divya Nedungadi and Anupama Binoy.

The study has been recently published as a manuscript titled, "Cancer Cell Labeling by Detecting Mitochondrial Hydrogen Sulfide" in the Chemical Communications journal on July 17, 2017. The application of a chemodosimeter 'turns on' the fluorescent probe for detecting endogenous H₂S formation in cancer cells. Mito-HS shows a bathochromic shift in UV-vis.-absorption spectrum from 355 nm to 395 nm in the presence of H₂S. Furthermore, it showed ~ 43-fold fluorescence enhancement at λ_{em} 450 nm in the presence of H₂S (200 μ M). The cancer cell-specific fluorescence imaging reveals that Mito-HS has the ability for distinguishing cancer cells from normal cells based on the level of endogenous H₂S formation. In due course, Mito-HS would be a powerful cancer biomarker based on its ability to estimate endogenous H₂S formation in living cells. ~~~



Firing Neurons with Amrita Yoga

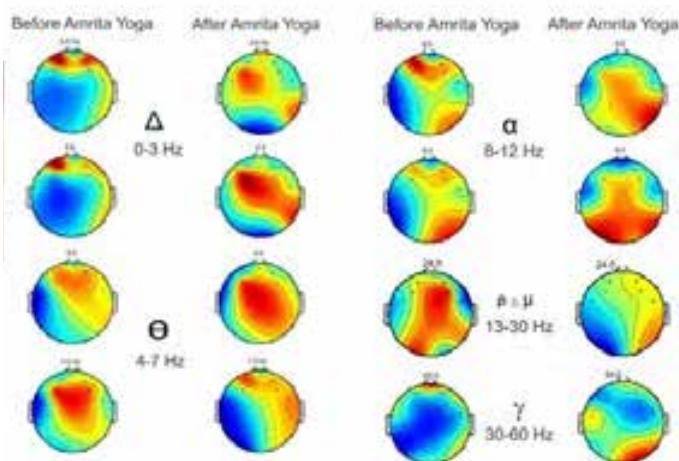


Under the guidance of Amrita Vishwa Vidyapeetham Chancellor, Sri. Mata Amritanandamayi Devi, Amrita Yoga Amritapuri and Amrita School of Biotechnology's Computational Neuroscience Laboratory are working on brain activities before and after yoga practice, using EEG and functional modeling on short and long term practitioners.



The activities are performed by characterizing changes in brain signals across various oscillations in the 0-80 Hz range, identified by neuroscientists as delta, theta, alpha, mu, beta and gamma waves (low-high).

In Amrita Yoga, the Delta activity increases (neural correlates to calmness and improved memory functions), Theta waves increases (lower mental fatigue, long term memory consolidation), alpha activity increases (lowers blood pressure, body sense), beta activity decreases and gamma activity increases (concentration, focus, memorization).



ASBT PhD Students Connect Laboratory Experiments to Parkinson's Disease Using Computer Modeling

Amrita Vishwa Vidyapeetham's PhD students Hemalatha Sasidharakurup and Nidheesh Melethadathil, along with, Dr. Bipin Nair, Dean, School of Biotechnology, Amritapuri, and Dr. Shyam Diwakar, Director, Computational Neuroscience and Neurophysiology, Amritapuri, published a paper titled, "A Systems Model of Parkinson's Disease Using Biochemical Systems Theory" in OMICS: A Journal of Integrative Biology, in the month of August 2017.

The research paper connects experimental data related to dopaminergic cell death from several molecular levels to conditions attributed to Parkinson's disease using a mathematical method called biochemical systems theory. Parkinson's disease is a neurodegenerative disease or a disease in the central nervous system that primarily affects motor nerves. It manifests itself with rigidity, shaking and a general slowing of movement. Various individual observations usually lead to hypotheses used for diagnosis and therapy in biomedical and clinical research such as in the story of Parkinson's disease or PD. Parkinson's disease is related to a condition often seen when dopamine producing neurons (brain cells) slowly start dying. For brain diseases, connecting molecular levels to brain functions is not direct or easy, as it involves several types of experiments at various levels. If hospital clinicians need to use laboratory experiments to study onset or progression of a disease, it is important these levels of studies are connected.

Dr. Shyam Diwakar adds, "Parkinson's, Alzheimer's and several other neurological conditions may not have solutions yet but to connect to solutions, it is pertinent for experimental scientists at various levels to work with computer-based modeling and with clinicians. Experiments from subcellular components such as ion channels and protein concentrations help associate to cellular function and need to translate then to circuit activity and then eventually to behavior and cognition. It is quite complex for a single laboratory or an individual to characterize the cellular signalling that happens. Only translational studies that connect multiple levels of research could help targeting new drugs and to a better understanding of the neurological disease. Our work is a beginning in that direction and we plan to use the data from labs to connect to circuit disorder using large-scale brain models".



The Prestigious

Ramalingaswami Fellowship

Awarded to

Dr. Indulekha C. L. Pillai

Dr. Indulekha C. L. Pillai, Assistant Professor, Amrita School of Biotechnology, Amritapuri, has been awarded the prestigious Ramalingaswami Fellowship from the Department of Biotechnology, Government of India, on 15th November 2017, for a period of 5 years.

As per DBT, "The Ramalingaswami Fellowship is conceptualized with the aim of attracting highly skilled researchers (Indian Nationals) working overseas in various cutting edge disciplines of biotechnology (agriculture, health sciences, bio-engineering, energy, environment, bioinformatics and other related areas), by providing them an attractive avenue to pursue their R&D interests in Indian institutions." Fellowship is awarded based on the candidate's significant research contributions, achievements, quality of the proposed research plan and its relevance to solve unmet problems in different fields of biotechnology.

Using Ramalingaswami award, Dr. Pillai aims to understand the molecular mediators of cardiac regeneration using mouse and zebrafish models of heart disease. Although few stem cells are present, the adult human heart does not have a robust ability to regenerate after injury and heals primarily through a fibrotic response (scar formation). In spite of major improvements in treating heart attack, regeneration remains a major challenge and heart injury progresses to

heart failure. Heart failure is fatal and so developing ways for improved cardiac regeneration is an unmet medical need and determines the outcome of life and death. The project focuses on

understanding the molecular regulators working in favour of activation of adult cardiac stem cells for regeneration, rather than scar formation. The successful completion of the project will provide novel insights into heart regeneration and could also lead to development of new strategies to enhance heart regeneration and functional repair after an injury. ~~~~

ASBT's Dr. Shyam Diwakar Presents at Workshop of MeitY's Young Faculty Research Fellows





IIT Madras Neuroscientist Visits School of Biotechnology

Dr. V. Srinivasa Chakravarthy, Department of Biotechnology, Indian Institute of Technology (IIT), Madras, visited Computational Neuroscience Laboratory, Amrita School of Biotechnology, from 20-22 July, 2017, and delivered talks on Basal Ganglia and Bharati - a common script for Indian languages.



His talk titled, "The Basal Ganglia as an Exploration Engine", addressed the computational principles of a prominent subcortical brain structure called basal ganglia and how it determines movement related functions. He addressed the direct and indirect pathways and used a model he had developed to explain the role of basal ganglia on Go/No-Go/Explore possibilities selection by brain circuit. Showcasing the circuit properties arising from constituent neurons, he suggested that the loss of neural dynamics complexity could be a sign of poor mental health. Raising a case study on Parkinson's Disease (PD), he also highlighted the basal ganglia role in PD and willed movement. Prof. Chakravarthy also highlighted the need to build gadgets tools to models, patient specific computational models and to match function to all levels sensory integration hierarchy, which he called the mesoscopic brain model.

Dr. Chakravarthy also addressed the Amritapuri campus on Bharati, a new script for unifying all Indian languages, that he has developed. He spoke of the commonness in languages and the need to help those who do not know a language, by using a common script for 22 languages. He showed that Bharati script could help bring down many communication barriers in India and save ink compared to some other Indian fonts when printing on boards. His presentation involved his case studies with school students in Andhra Pradesh and Chennai.

Prof. Chakravarthy and Amrita School of Biotechnology's Dr. Shyam Diwakar, Lab Director of Computational Neuroscience and Neurophysiology Laboratory, a Faculty fellow at the Amrita Center for International Programs and an Associate Professor at the School of Biotechnology, modeled large scale brain circuits for neurological disorders, predictions of physiological circuits and did case studies on bio-robotics. ~~~



Dr. Shyam Diwakar presented ongoing work on Computational Neuroscience and his comments on future research at the one-day workshop for Young Faculty Research Fellows organised at Indian Institute of Science, Bengaluru by Media Labs Asia and Ministry of Electronics and IT, Government of India on 28th of July, 2017.



Amrita School of Biotechnology's Dr. Shyam Diwakar was awarded the Young Faculty Research Fellowship under Sir Visvesvaraya PhD scheme in April 2016 and is among the 100 young faculty members with this fellowship. In the presentation at IISc, Dr. Shyam had covered ongoing research at Amrita School of Biotechnology, covering computational neuroscience models taking data from experiments, detailed and simple models and their applications, devices from neuroinspired technologies and need for support and connections among working groups.

The one-day workshop was attended by the Members of the Academic Committee of the Visvesvaraya PhD scheme including Prof. S.V. Raghavan, Scientific Secretary (Retd.), Office of the Principal Scientific Advisor to the Government of India & Chairman, Academic Committee and senior officials of MeitY, Government of India. ~~~

SWAGATHAM 2017



Swagatham 2017, held on 27th July, 2017, was an unforgettable event that was filled with excitement, joy, music, enthusiasm, and laughter, and was marked as a memorable day in the life of the new students at Amrita School of Biotechnology.

The day started with a traditional welcome from the senior students after which each incoming student lit a lamp, signifying the light of knowledge, to be placed at the feet of Saraswati Devi, the Goddess of Learning. This ceremony was followed by the official inaugural programme at Amriteshwari hall with the opening prayer followed by the traditional lighting of the lamp. Dr. Bipin Nair, Dean Amrita School of Biotechnology, gave the welcome address. In his speech he highlighted the growth of the school since 2004 and how Amrita had established its presence as a preferred institution of higher learning in the field of Biotechnology and related Life Sciences in the short time that it has been in existence. He also encouraged the students to benefit from the dedicated, experienced faculty and use well the opportunity to interact, learn, advance and succeed in a career in Biotechnology and related life sciences. Swamini Krishnamrita Prana, one of our Chancellor Amma's senior disciples, delivered the benedictory address in which she detailed the importance of biotechnology and how dedicated research could lead to the development of novel strategies that could ultimately contribute to the well-being of the society.

The students were then introduced to the various initiatives that acts as a platform to showcase the fabulous array of talents that the students possess and to cultivate their creativity and imagination in programmes like AYUDH and Creatome. The inaugural programme concluded with the distribution of Prasad by Swamini Krishnamrita Prana to all the new students.

After the official inaugural programme, students had an informal session with their seniors which served as a fun-filled opportunity for the incoming students to interact with and get acquainted with one another. The program initiated not just a new semester, but also many new members into the Amrita family and was truly an amazing day that will be remembered and cherished.

My Internship in Ireland

A Student's Memoir of Her Summer Experience Abroad

Words are inadequate to explain the gratitude and immense joy I felt at being chosen for the University College Dublin (UCD) Summer Research Internship Program during my first year of M.Sc. Biotechnology at Amrita School of Biotechnology. The internship was



STUDENT LIFE AT ASBT



AUG
7Forgiveness Day and
RakshabandanSEP
10

14th Graduation Day

AUG
15

Bharat Mata Puja 2017

OCT
19

Diwali Celebrations



arranged through the Amrita Center for International Programs and I was selected from a pool of over 110 applicants. I was excited about being chosen for such an experience, and at the same time a little nervous of facing a completely new challenge all on my own.

Once I reached UCD, I immediately felt at home because the people I interacted with were very warm and friendly. I was very fortunate to work with a brilliant professor there, Dr. Ioscani Jimenez del Val, who was very encouraging and supportive. The PhD research scholar, Itzcoatl Gomez, I was assigned to work under was also a constant source of motivation and a patient teacher. We worked together on his PhD Research Project, which was titled 'Maximising therapeutic protein galactosylation: simultaneous removal of metabolic and cellular machinery bottlenecks'.

I was in charge of an entire Animal Cell Culture Lab without any restrictions. He taught me Mammalian Cell Culture techniques - including subculturing, cryopreservation, cell counting for viability and how to use these to chart the growth kinetics of a Chinese Hamster Ovary cell line (CHO DP-12) and elucidate the growth rate, glucose consumption, maximum viable cell density peak, and culture time in batch mode. In addition, I imparted a few of the bacterial cell culture techniques and molecular cell biology laboratory skills that I learned from college to him, which helped in his work. Furthermore, the picturesque landscapes of Ireland filled with the old-worldly charm of the ancient castle ruins and unceasing green pastures added another dimension to the trip which had me in awe right from the start.

The coursework at Amrita School of Biotechnology really helped me understand a lot of things in the lab that I had worked on. So I am eternally grateful that I chose this college to pursue my degree because I am in an environment where I am loved and taken care of- a home away from home.

- Ivy Rose Sebastian (M.Sc. Student) ~



RECENT PUBLICATIONS

Journal Articles

1. Velusamy N., Binoy A., Bobba K.N., Nedungadi D., Mishra N., Bhuniya S. A bioorthogonal fluorescent probe for mitochondrial hydrogen sulfide: new strategy for cancer cell labeling. *Chem Comm.* 2017, 53(62): 8802-8805.
2. Sasidharakurup H., Melethadathil N., Nair B., Diwakar S. A Systems Model of Parkinson's Disease Using Biochemical Systems Theory. *OMICS: A Journal of Integrative Biology.* 2017, 21(8): 454-464.
3. Achuthan K, Francis S. P., Diwakar S. Augmented reflective learning and knowledge retention perceived among students in classrooms involving virtual laboratories. *Education and Information Technologies.* 2017, 22(6): 2825-2855.
4. Raveendran J., Resmi P.E., Ramachandran T., Nair B.G., Babu T.S. Fabrication of a disposable non-enzymatic electrochemical creatinine sensor. *Sensors and Actuators B: Chemical.* 2017, 243: 589-595.
5. Radhamani R, Kumar D, Nizar N, Achuthan K, Nair B, Diwakar S. Implementation of ICT-based Virtual Labs for Sustainable Laboratory Education in Universities. *CSI Journal of Computing.* 2017, 3(2): 67-75.
6. Advani J. Subbannayya Y., Patel K., Ahmad K.A., Patil A.H., Jain A.P., Solanki H.S., Radhakrishnan A., Pinto S.M., Sahasrabudhe N.A., Thomas J.K., Mathur P.P., Nair B.G., Chang X., Prasad T.S.K., Sidransky D., Gowda H., Chatterjee A. Long-Term Cigarette Smoke Exposure and Changes in MiRNA Expression and Proteome in Non-Small-Cell Lung Cancer. *OMICS: A Journal of Integrative Biology.* 2017, 21(7): 390-403.
7. Chatterjee M., D' Morris S., Paul V., Warriar S., Vasudevan A.K., Vanuopadath M., Nair S.S., Paul-Prasanth B., Mohan G.C., Biswas R. Mechanistic understanding of Phenylacetic acid mediated inhibition of quorum sensing and biofilm development in *Pseudomonas aeruginosa*. *Applied Microbiology and Biotechnology.* 2017, 101(22): 8223-8236.
8. Reshmi C.R., Menon T., Binoy A., Mishra N., Elys K.K., Sujith A. Poly(L-lactide-co-caprolactone)/collagen electrospun mat: Potential for wound dressing and controlled drug delivery. *International Journal of Polymeric Materials and Polymeric Biomaterials.* 2017, 66(13): 645-657.
9. Chellaiah P., Achuthan K., Nair B., Diwakar S., Using Theme-based Narrative Construct of Images as Passwords: Implementation and Assessment of Remembered Sequences. *International Journal of Online Engineering (iJOE).* 2017, 13(11): 77-93.
10. Raveendran J., Krishnan R.G., Nair B.G., Satheesh Babu T.G. Voltammetric determination of ascorbic acid by using a disposable screen printed electrode modified with Cu(OH)₂ nanorods. *Microchimica Acta.* 2017, 184(9): 3573-3579.
11. Pandurangan N, Bose C, Sreejith M, Veni C K, Anjana M Amrita and Anjana R P. Synthesis, bioactivities and in-silico docking studies of azaleatin-a quercetin partial methyl ether: SAR study. *Current Bioactive Compounds.* December 2017 Pages 1 - 6 (6).

Book Chapters

1. Diwakar S., Moustafa A.A. *Cerebellum and its disorders: A Review of Perspectives from Computational Neuroscience*. Computational Models of Brain and Behavior, Wiley-Blackwell. 2017, Chapter 22, 303-319.
2. Diwakar S., Medini C., Nair M., Parasuram H., Vijayan A., Nair B. Computational Neuroscience of Timing, Plasticity and Function in Cerebellum Microcircuits. In: Erdi P., Sen Bhattacharya B., Cochran A. (eds) *Computational Neurology and Psychiatry*. Springer Series in Bio-/Neuroinformatics 2017, vol 6.

Conference Papers

1. Alphonse J., Medini C., Nair B., Diwakar S., An Open-Source Computational Neuroscience Virtual Laboratory Tool for Simulating Spiking Neurons and Circuits, Proceedings of the Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017), Manipal University, Karnataka, India, Sept 13-16, 2017.
2. Nizar N., Radhamani R., Kumar D., Nair B., Achuthan K., Diwakar S., Implementation of Analog Electrical Neurons As Virtual Labs for Neuroscience Education, Proceedings of the Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017), Manipal University, Karnataka, India, Sept 13-16, 2017.
3. Vijayan A., Gopan V., Nair B., Diwakar S., Comparing Robotic Control using a Spiking Model of Cerebellar Network and a Gain Adapting Forward Inverse Model, Proceedings of the Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017), Manipal University, Karnataka, India, Sept 13-16, 2017.
4. Bodda S., Palathingal R. K., Shankar V., Nair B., Diwakar S., Modeling Population Network Activity using LFPsim, Spiking Neurons and Neural Mass Models, Proceedings of the Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017), Manipal University, Karnataka, India, Sept 13-16, 2017.
5. Rajendran A., Thankamani A., Nirmala N., Nair B., Diwakar S., Computational Neuroscience of Substantia Nigra Circuit and Dopamine Modulation During Parkinson's Disease, Proceedings of the Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017), Manipal University, Karnataka, India, Sept 13-16, 2017.
6. Nutakki C., Narayanan J., Anchuthengil A. A., Nair B., Diwakar S., Classifying Gait Features for Stance and Swing Using Machine Learning, Proceedings of the Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017), Manipal University, Karnataka, India, Sept 13-16, 2017.
7. Sasidharakurup H., Dash P., Nair B., Diwakar S., Computational Modelling of Apoptosis in Parkinson's Disease using Biochemical Systems Theory, Proceedings of the Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017), Manipal University, Karnataka, India, Sept 13-16, 2017.
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9. Nair M., Suresh A. P., Manoharan A., Nair B., Diwakar S., Information Theoretic Visualization of Spiking Neural Networks, Proceedings of the Sixth International Conference on Advances in Computing, Communications and Informatics (ICACCI-2017), Manipal University, Karnataka, India, Sept 13-16, 2017.
10. Porayath C., Salim A, Archana PV, Babu P, Nair B, Madhavan A, Pal S. Characterization of the bacteriophages binding to human matrix molecules, *International Journal Of Biological Macromolecules*, 2017.
11. Krishnaraj K.U., Nair S.V., Chandran P. Highly facile solvolytic reactions of α -Oxoketene Dithioacetals: A green chemistry route to β -Oxo thiolcarboxylates. *Proceedings of international Conference on Tropical Plants and Molecular Design 2017*, T K M College, Kollam.
12. Radhamani R, Nizar N., Kumar D., Nair B., Achuthan K., Diwakar S. Low cost neuro-inspired robots for sustainable laboratory education. *International Conference on Robotics and Automation for Humanitarian Applications, RAHA 2016.*
13. Melathadathil N, Pazhanivelu S, Nair B, Diwakar S. Using Machine learning to understand data analysis - A case study of a private health care organisation. *6th International Conference in Advances in Computing, Communications and Informatics (ICACCI-17).*
14. Kumar D, Achuthan K., Nair B., Diwakar S. Online bio-robotics labs: Open hardware models and architecture. *International Conference on Robotics and Automation for Humanitarian Applications, RAHA 2016.*

2017 ROUND-UP



31

RESEARCH ARTICLES

15 articles/14 conference/2 book chapters



213

STUDENTS ENROLLED

126 UG/83 PG/4 Ph.D



187

STUDENTS GRADUATED

105 UG/80 PG/2 Ph.D



30

AWARDS/RECOGNITIONS

8 staff/ 22 student

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