



Indian Institute of Technology Madras
Office of Alumni and Corporate Relations

Celebrating the Generosity of

Mr. Shrikumar Suryanarayan

Impact of your giving in 2023

Director's Message

Prof. Kamakoti Veezhinathan Director, IIT Madras

Greetings!

IIT Madras continues to retain her top position for the eighth consecutive year, in the National Institute Ranking Framework, thanks to the world-class research of its faculty and students. The contribution and support of Alumni and well-wishers like you has crucially helped this standing and stature. Our achievements in research, education, innovation and entrepreneurship have also earned us the recognition of an 'Institute of Eminence' as well as the top position in the Atal Innovation Ranking from the Government of India.

The institute is making an indelible mark with her 'research with impact' in several areas including quantum computing, drinking water technology, industrially relevant mathematical models for governance, rendering cancer-cure more effective. Our centres of excellence, the Center for Innovation, Nirmaan - the pre-incubator, the Incubation Cell, technology centres such as 'IITM-Pravartak' and others, work in unison for not just our nation's building, but societies world-wide. We aspire to be locally impactful and globally relevant through all these efforts.

Towards exploring new research frontiers, a Department of Medical Sciences and Technology has been launched to conjoin medicine and engineering. Similarly, a School of Sustainability is on the horizon to research sustainable practices in the Global South. The campus is moving towards 'carbon-net-zero' goal through water conservation by 100% recycling, efficient garbage disposal, and electrification of vehicles. The traditional education system is undergoing a paradigm shift, with our online Bachelor of Science programme in Data Sciences and the National Program of Technology Enhanced Learning, that have won Gold in the 'Lifelong Learning' category and Silver in the 'Best Online Program' category of the Wharton-QS Reimagine Education Awards 2022 respectively. IIT Madras is leading this revolution from the front.

Such achievements are not possible without the deep-rooted faith and support of alumni and well-wishers such as yourself. We are indebted to you for your generous, bountiful, and impactful contributions. On behalf of IIT Madras, I offer you our deepest gratitude for continuing to strengthen the Institute. Together with your support, we are confident of building an IIT Madras that is more inclusive, diverse, and enabled by an ecosystem to be nationally relevant and globally recognised. Thank you!

Prof. Mahesh Panchagnula Dean Alumni & Corporate Relations, IIT Madras

Greetings!

I express my heartfelt gratitude to you for your generous support to IIT Madras. We appreciate your passion in supporting the causes you do and I assure you that your contributions will be optimally utilised. This report has been compiled to convey how your largesse has touched lives and made a difference at IIT Madras. In keeping with the rapid, contemporary strides in science, technology we have set ambitious goals for ourselves - your continued enthusiasm and support will help us greatly in these endeavours.

IIT Madras is far more diverse in its set of pursuits, more green and more research-focused. And yet, it remains unchanged over these years, it is still the best Institute in the country, and attracts the best students that India has to offer to come and make a mark. I also cordially invite you to visit your campus to see for yourself, the impact of your contribution, and the growth and transformation the Institute has undergone over the years.

We can never express our gratitude enough for all that you have done - Thank You !

Mr. Shrikumar Suryanarayan



1982/BT/CH

Chairman and Managing Director, Sea6 Energy Pvt. Ltd

The Managing Director and co-founder of Sea6 energy Pvt. Ltd Shrikumar Suryanarayan is one of the notable alumni of Indian Institute of technology, Madras. His contribution in the field of biotechnology, biochemistry and life sciences have impacted the world in an uncommendable way. He is an entrepreneur, innovator and business strategist who holds great value for Research and development.

Shrikumar Suryanarayan did his Bachelor of Technology in Chemical Engineering from IIT Madras in the batch of 1977-1982 and his Master of technology in biochemical and biotechnology from IIT Delhi 1982-84. He was the former president and the head of R&D department of Biocon ltd and the chief scientific advisor to the company. He was associated with the company for more than 25 years. He has also been the chief executive officer for the Translational Health Sciences Institute from 2009-2010 under the department of biotechnology of the government of India. He has also served as an Honorary Adjunct Professor at the Department of Biotechnology at the Indian Institute of Technology, Madras, Honorary Director General at Association of Biotechnology Lead Enterprises (ABLE) which is the Indian biotechnology industrial association, and as an Honorary Executive Director at the Center of Cellular and Molecular Platform (C-CAMP).

Mr. Shrikumar Suryanarayan has received the distinguished alumnus award in 2009 by IIT Madras and the Biospectrum entrepreneur award of the year 2011 from Biospectrum. He has made groundbreaking research and have added exemptional achievements in the field of biotechnology, biochemistry, molecular biology and drug discovery which have resulted in significant developments.

The report will present a thorough assessment of the impact that your contributions have made towards the following causes.

Student Distress Fund

Infrastructural & research funds for Hydrothermal conversion research at NCCRD

1982 Batch Coral Reunion - NPTEL Studios

Alumni Community Institute Chair

Entrepreneurship Scheme for Biotech Department

Renovation of Chemical Engineering Auditorium

iGEM Competition

Centre for Social Innovation and Entrepreneurship (CSIE)

The Divashri Award

Prof. M S Ananth International Symposium

Divashri - Algal Biofuels Biotechnology Department

Student Distress Fund



The Student Distress Fund was set up to lend a helping hand to students who require financial support. When students are faced with unfortunate situations like accidents, loss of family members/ breadwinners of the family, the promising fund has brought light into the lives of students. These difficulties should not hamper or deprive the education of the bright minds who have worked hard and earned their befitting place in this prestigious Institute. Rightfully, this fund has helped many students in need and have inspired a few of them to carry forward this legacy of helping those in need.



KANNAN

ED21S017

MS research scholar in Engineering Design

Family background:

I am from a rural area in the Perambalur district, Tamilnadu. My father is a wage worker and farmer earning 8000 / month and mother is a housewife. I have one sister (who studied up to 12th std) and a brother (who studied up to 10th std) and I am the first graduate in my family.

Reason for applying for the Distress Fund:

As I mentioned, I live in a rural area. Due to the poor network connection in my village, I was forced to come to Chennai to attend online classes during the Corona peak time. I had to spend more money on accommodation and I was not able to handle it.

Aspirations for the Future:

I would like to start a start-up and fund at least 10 rural students for their studies.

Achievements:

My abstract was accepted for oral presentation in the 15th WCSMO, IRELAND, CORK.

How the fund was useful to me:

It helped me to overcome my financial need during the corona time and continue my studies happily.

Gratitude note to the donors:

“ Dear Sir/Madam,
I am expressing my sincere gratitude for your tremendous generosity in helping me during this hard time. I can't express enough gratitude to you for your generosity and assistance, which have had a profound effect on my life. I am happy to inform you that I have been volunteering for almost 10 years in an NGO (Payir India) and doing a Career guidance program for 12th-grade government students.

”

For more details about this cause

[CLICK HERE](#)



Infrastructural & research funds for Hydrothermal conversion research at NCCRD

Effects of Co-solvents on the Product Yield and Quality in the Hydrothermal Liquefaction of Red Macroalgae Species:

In the hydrothermal liquefaction (HTL) of red macroalgae species, the use of co-solvents can significantly influence both the product yield and quality. Co-solvents play a crucial role in the HTL process by affecting the reaction conditions and the solubility of biomass components.

Here are some key points regarding the effects of co-solvents on the product yield and quality:

Enhanced Product Yield:

- Co-solvents can enhance the solubility of biomass components, leading to increased conversion rates and higher product yields.
- The improved dissolution of macroalgae in the presence of co-solvents promotes better accessibility of reactants and accelerates the liquefaction process.

Increased Bio-oil Quality:

- The addition of co-solvents can contribute to the production of higher-quality bio-oil by reducing undesirable by-products, such as char and tar.
- Co-solvents may help control the reaction pathways, favoring the formation of liquid bio-oil with desirable properties, such as higher energy content and lower oxygen content.

Optimized Reaction Conditions:

- Co-solvents can modify the reaction conditions, such as temperature and pressure, leading to improved efficiency and selectivity in the HTL process.
- The presence of co-solvents may enable the use of milder reaction conditions, reducing energy requirements and operational costs.

Solvent Selection Impact:

- The choice of co-solvent is crucial, as different solvents have varying effects on the HTL process. Common co-solvents include water, organic solvents, and supercritical fluids.
- The compatibility of the co-solvent with the red macroalgae species and the desired product outcomes must be considered for optimal results.

Environmental Considerations:

- Co-solvents can influence the environmental sustainability of the HTL process. Sustainable and renewable co-solvents may align with the goal of developing environmentally friendly biofuel production methods.

Economic Implications:

- The economic feasibility of using co-solvents in the HTL process should be assessed, considering factors such as solvent cost, recycling possibilities, and overall process efficiency.

Feed Stock Analysis:

- Feedstock analysis in the context of HTL refers to the assessment and characterization of the raw materials or feedstock used in the process.
- Both types of macroalgae contain low amount of carbon and high amount of ash.
- The amount of oxygen is also quite high in both the biomasses. However, a high amount of volatile matter and fixed carbon is available in the feedstocks.
- The moisture content of both the feedstocks is approximately 10 wt.%.
- The amount of sulphur and nitrogen in the macroalgae can be observed to be minimal as it is below the detectable limit.

Product Yields from HTL Experiments with Macroalgae:

- Without adding any co-solvent in the experiments, the biocrude yield was the lowest (around 2-3 wt.%) for both types of biomasses. This condition also resulted in the highest production of water-soluble products, possibly due to biomass degradation and the loss of volatile content over time.
- The use of a different reactor with better temperature control, maintaining the final temperature within a 5°C range, led to better results compared to an older reactor with a larger temperature deviation (15°C).
- In experiments with a 5% co-solvent, glycerol produced the highest biocrude yield. However, Ethylene Acetate and Ethanol were not successful in maximizing biocrude yield from macroalgae.
- The biocrude yield increased with a higher percentage of co-solvent (up to 26 wt.%). Additionally, these experiments showed a decrease in the production of water-soluble products.

GC / MS Analysis of Biocrude Product:

- Experiments without co-solvents mostly resulted in the highest concentration of cyclic oxygenates in the biocrude phase.
- The addition of co-solvents increased the migration of sulphur into the biocrude.
- The highest selectivity for sulphur compounds occurred when 5% Glycerol was added.
- Glycerol also enhanced the production of phenolics in both types of biomasses.
- Ethyl acetate promoted the selectivity of aliphatic oxygenated compounds in the biocrude phase.

Analysis of Feedstock and Biochar:

- Most of the biochar produced from the experiments contained a low amount of ash. This is due to the dissolution of the water-soluble salts into the aqueous phase.
- Consequently, this led to the improvement in the quality of the biochar, which can be observed in the high amount of fixed carbon present in them.
- The HHV of the biochar were in the range 15.2 to 21.8 MJ kg⁻¹.

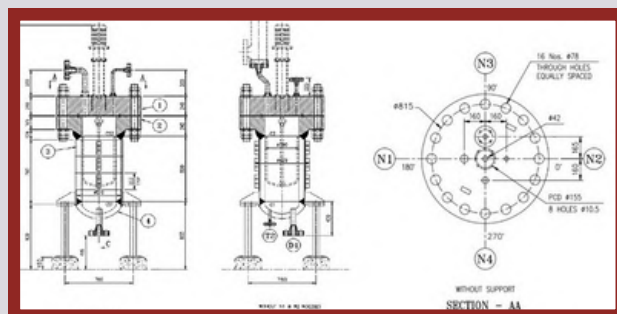
Analysis of Biocrude Product:

- The biocrude's calorific value, obtained from experiments conducted without the use of co-solvents, was the lowest compared to all other conditions. This is likely attributed to these samples having the lowest carbon content and the highest oxygen content.
- The rise in sulphur levels, as observed in the GC/MS data, aligns with the elemental analysis of the samples, confirming the increase in sulphur content.
- Furthermore, an uptick in nitrogen content was noted in the biocrude. This information is sourced from research conducted at IIT Madras in the field of Chemical Engineering.

Analysis of major ions in the HTL Aqueous Phase:

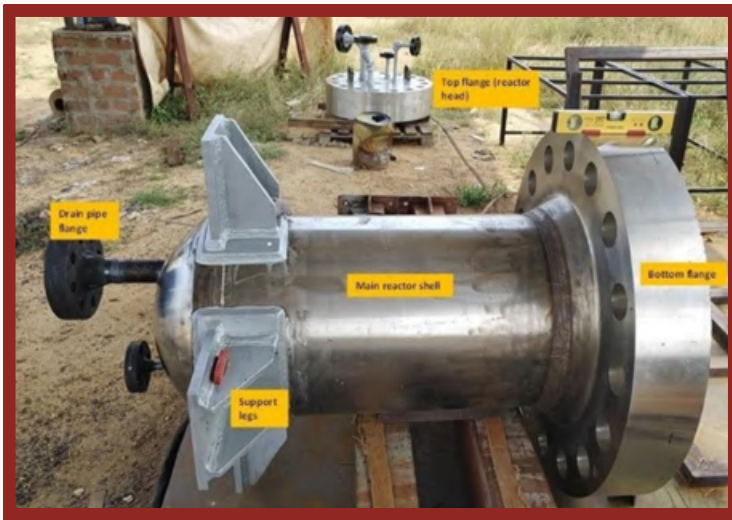
- The aqueous phase displayed high levels of chloride, potassium, sodium, and sulphate ions, which can be traced back to their presence in the original feedstock.
- Methanol and Glycerol as solvents were found to encourage reactions leading to the formation of predominantly organic or insoluble nitrogen-based compounds.
- *Eucheuma spinosum* biomass exhibited a more pronounced production of acetate ions compared to other cases.
- The concentration of calcium in the aqueous phase was lower, mainly because most of its compounds have limited solubility in water.

Development of 100 L HTL Reactor - Progress Status



Final drawing of reactor

Reactor assembly at factory and unloading



Reactor parts received at IIT Madras



(a) 100 L reactor vessel



(b) Reactor Head



(c) Main control panel, stirrer assembly, electrical heater



Assembles reactor at the Chemical Engineering Laboratory at IIT Madras



Bolts design and Fabricated bolts



1982 Batch Coral Reunion – NPTEL Studios

1982 batch coral reunion supported for the construction of NPTEL Studios. The Inauguration of NPTEL Studios in Classroom Complex, IIT Madras On March 26, 2021



Alumni Community Institute Chair



PROF. R. NAGARAJAN

Department of Chemical Engineering

First occupant of Alumni Community Institute Chair

Academic Background:

- Bachelor of Technology (1981) from the Indian Institute of Madras
- Ph.D. (1986) from Yale University, United States

Research Interests:

- Ultrasonic and megasonic fields
- Cleanroom and contamination control
- Nano-particle synthesis and nano-composite formulation

Prof. R. Nagarajan is the Alumni Community Chair Professor, Department of Chemical Engineering, IIT Madras, Robert T. Henson Distinguished Visiting Scholar, Davidson School of Chemical Engineering, Purdue University. After completing his 3-year term as Head of the Department of Chemical Engineering, Prof. Nagarajan has undertaken his sabbatical at Purdue University as Robert T. Henson Distinguished Visiting Scholar in the Davidson School of Chemical Engineering. He has conducted a Seminar Series on "Contamination Control in High Purity Manufacturing" for Purdue faculty and students. He has presented a paper at the WOCA 2022 (World of Coal Ash) conference at Covington, Kentucky, and organized a Panel at the Deshpande Symposium in Cleveland, Ohio.

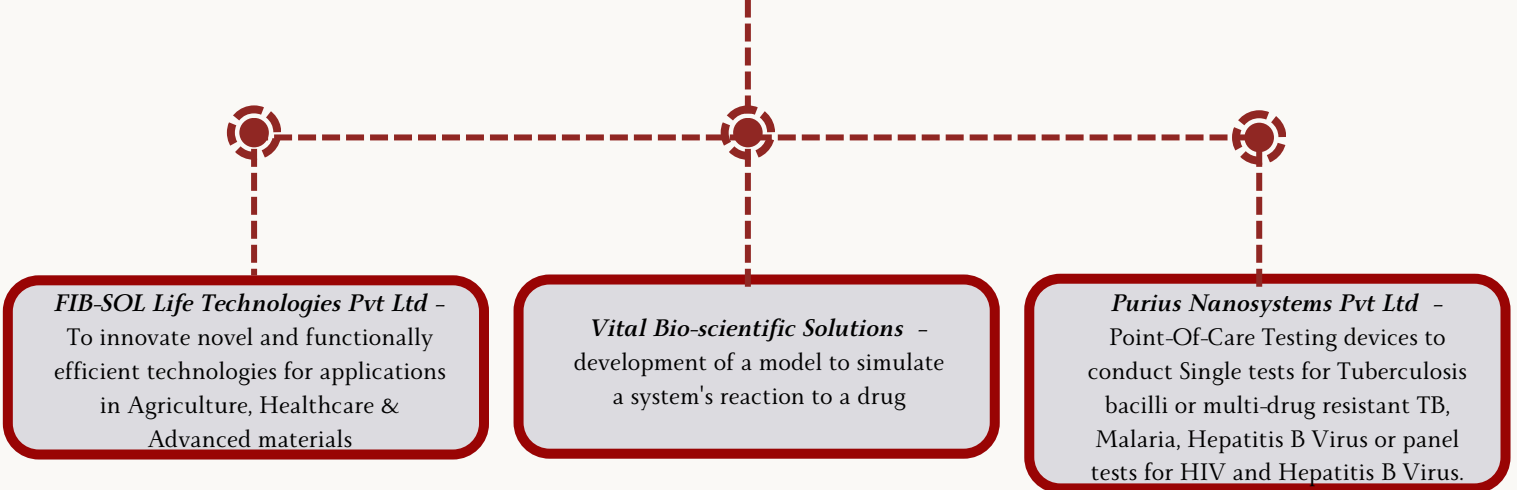
A CSR project, funded by Kris and Sudha Gopalakrishnan's Pratiksha Foundation, is now in its 2nd year. With the objective of formulating nano-emulsions of spice oils for cancer treatment, the work has progressed satisfactorily to the stage of animal trials. His research priorities are coal beneficiation using the ultra-sonic fields, nano emulsions of plant oils used for cancer treatment and dust-repellent surfaces and coatings for building exteriors.



Entrepreneurship Scheme for Biotech Department

Mr. Shrikumar has also contributed to the Entrepreneurship Scheme for the Biotech Department for the entrepreneurship initiatives of IITM which is keen area to him in his alma mater. He has been a driving force for these initiatives and desire for giving back to this area as privilege. His mantra is to encourage technological entrepreneurship which is really important for our country as it creates jobs with vibrant and creative industrial base. The main objective of this scheme is to launch a Life-Science start-up enterprise which quenched his innovative ideas as the platform.

Incubatee companies funded by this scheme



FIB-SOL Life Technologies Pvt Ltd - To innovate novel and functionally efficient technologies for applications in Agriculture, Healthcare & Advanced materials

Vital Bio-scientific Solutions - development of a model to simulate a system's reaction to a drug

Purius Nanosystems Pvt Ltd - Point-Of-Care Testing devices to conduct Single tests for Tuberculosis bacilli or multi-drug resistant TB, Malaria, Hepatitis B Virus or panel tests for HIV and Hepatitis B Virus.



Renovation of Chemical Engineering Auditorium

It is so thoughtful of giving the contribution towards “Renovation of Chemical Engineering Auditorium” by Mr. Shrikumar is well received. Incidentally his talk also done in the same auditorium where he contributed to renovate the Chemical Seminar Hall (MSB 241) later.



iGEM Competition

iGEM, IIT Madras is a group of individuals passionate about the fascinating field of synthetic biology. The students participate in the International Genetically Engineered Machine competition every year. The 'machines' at work here are the small, yet incredibly complex bundles of life growing on a Petri plate! Teams from around the world compete by addressing daily issues with their designs of engineered biological systems. The goal of the competition is to develop an international collaborative community for the growing field of synthetic biology. IIT Madras has a long history with iGEM as well, having taken part in more than ten editions since 2008, and has received numerous accolades at the international stage.

For more details about the iGEM Competition [CLICK HERE](#)



Centre for Social Innovation and Entrepreneurship (CSIE)

The Centre for Social Innovation and Entrepreneurship (CSIE) at IIT-Madras was founded in August 2010 with a focus on teaching and research related to social enterprise in India. It aims to bring together the innovation and entrepreneurship aspects of IITM by creating knowledge and understanding that will be relevant to the problems that the poor in India face.

CSIE mission is to build an environment that will facilitate the creation of social enterprise knowledge through research and empower students to apply their entrepreneurship abilities to develop solutions for greater social impact through academia.



Divashri Award

The award consists of a silver medal and cash award of Rs. 15000/- to the B. Tech student with the best academic record in Biotechnology.

Year	Roll No	Awardee Name
2012	BT08B007	Chaitra P
2013	BT09B007	Chetan S
2014	BT10B001	Akhil Sai Valluri
2015	BT11B014	Guruprasad Raghavan
2017	BS12B052	Nandakumar R
2018	BS13B008	Devanshu
2019	BS14B018	Prathamesh Suresh Jain
2020	BS15B010	Deepak
2021	BS16B005	Mohammed Faidh A
2022	BS17B002	Sathvik A
2023	BS18B004	Gayathri Prakash



Prof. M S Ananth International Symposium

The International symposium on 'Recent and Emergent Advances in Chemical Engineering (REACH) 2010 was held in IITM from Dec 2-4, 2010. The symposium was primarily organized to honour the academic contributions of Prof. M.S. Ananth on his turning 65. This symposium was supported by Mr. Shrikumar and other alumni, corporate and well-wishers.



Divashri – Algal Biofuels Biotechnology Department

This project initially addressed the development of alternate cultivation systems for microalgae, and then addressed some more studies on improvement of many cultivation aspects of microalgae such as electro flocculation.

Institute Memories:

In 2009, Mr. Shrikumar Suryanarayan was honored with the prestigious distinguished alumnus award during the 50th Institute Day.



Mr. Shrikumar Suryanarayan speaks at the 50th Institute Day, 2009



We are grateful to you



Mr. Shrikumar Suryanarayan and family

Thank you for your sustained generosity to IIT Madras over the years. Contributors such as yourself enable our students and Professors to dream big and work towards a better and brighter future. We hope you are proud of your alma mater and how it has remained steadfastly committed to academic and research excellence during and after your time here. You and your family have been instrumental in facilitating this significant growth.

Our efforts to nurture the culture of academic excellence that is the hallmark of IIT Madras - quality education, cutting-edge research, and unfettered creativity - shall continue. We are privileged and humbled to have you and your family walking with us along this trail. We wish you and your family the best always in all walks of life!



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December 2023