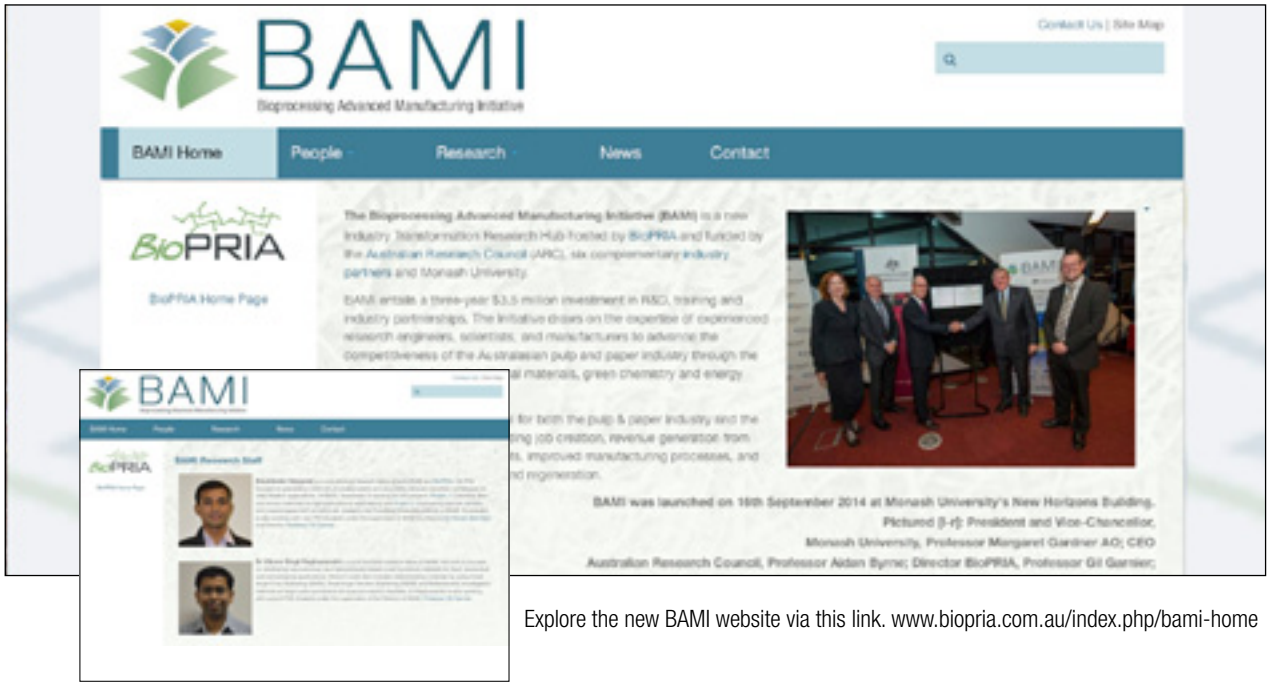
BAMI NEWS MAR 2015
THE NEWSLETTER OF THE BIOPROCESSING ADVANCED MANUFACTURING INITIATIVE

BAMI website facilitates improved stakeholder engagement

A new website provides up-to-date information about the people and projects that make up the Bioprocessing Advanced Manufacturing Initiative.



Explore the new BAMI website via this link. www.biopria.com.au/index.php/bami-home

The BAMI website brings together all the strands of the Industry Transformation Research Hub, connecting researchers, research fellows, post-graduates and industrial partners under one easy to navigate and accessible platform. The site is a perfect vehicle for communicating information about up-coming events, seminars, presentations and publications emerging from the Initiative, both internally and to the wider public.

Over the next few months, the BAMI site will evolve and expand to enable the industrial partners to login and engage with the progress of the 10 projects being undertaken as part of the Initiative. BAMI Co-Director, Dr Warren Batchelor commented on the new site, saying "We're excited to launch our new website and look forward to using it as valuable tool to work and engage with our partners on our joint research."

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Staff Profile

Dr Swambabu Varanasi

One of two Post-Doctoral Research Fellows engaged in the Bioprocessing Advanced Manufacturing Initiative, Dr Swambabu Varanasi's work is focused on the development of novel functional materials from cellulose nanofibres.

Swambabu received his Master's degree from the Indian Institute of Technology in Delhi. Following this, he worked for four years as a lecturer in the School of Chemical & Biotechnology at Sastra University in India. In 2011, Swambabu enrolled at Monash University to undertake a PhD and graduated in October 2014.

Swambabu brings considerable expertise to the functional materials platform at BAMI, particularly as the focus of his PhD was on preparation methods for biodegradable and recyclable cellulose nanofibre membranes for ultra-filtration applications. His doctoral research produced three major innovations in the field: firstly, in terms of the characterisation of nanofibres; secondly, he developed an efficient preparation method to produce cellulose nanofibre sheets; and thirdly, the production of composite membranes for ultra-filtration applications. As a result of his research, Swambabu was able to prepare a 20cm diameter membrane for $0.20 — at least two orders of magnitude lower than the current price of manufacturing the same membrane using regenerated cellulose.

At BAMI, Swambabu is working on Project 1: Cellulosic fibre non-woven materials for high performance applications and Project 3: Engineering specific barriers with coated paper. He will also be working with new PhD students under the supervision of BAMI Director, Professor Gil Garnier and Co-Director, Dr Warren Batchelor.

Research News

Characterisation of cellulose nanofibres & process modification

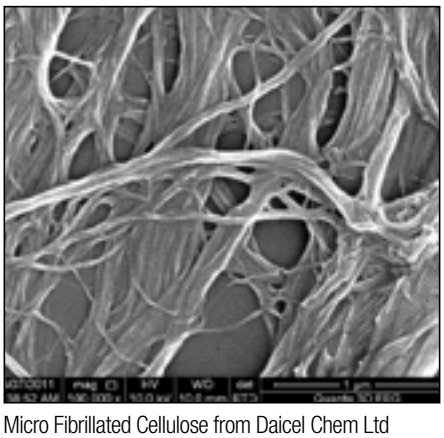
BAMI's functional materials platform is building on research that is already underway at BioPRIA, into methods of characterising cellulose nanofibres (CNF) and in the production of nanocellulose films.

According to BioPRIA postgraduate student, Praveena Raj there are two major challenges facing the production of CNF for high performance applications: firstly, how to make the process feasible on a large scale; and secondly, how to develop methods for characterising the material with greater depth. Praveena's research, undertaken alongside other doctoral and post-doctoral students, is focused on addressing these challenges, specifically related to the aims of BAMI Project 1: Cellulosic fibre non-woven materials for high performance applications.

In terms of the characterisation of CNF, while the diameter of a fibre can be established using a Scanning Electron Microscope (SEM) image (see below), establishing the length of the fibre is more difficult. Utilising a sedimentation method, the research group was able to obtain the aspect ratio of the fibre and, as a result, ascertain its length.

Responding to the first challenge — how to make the production of CNF feasible on a large scale — the group was able to significantly reduce the drainage time in the production of nanocellulose films. Traditionally, drainage times have ranged from 45 minutes to three or four hours. By increasing vacuum pressure and adding polyelectrolytes to the fibres, the research group was able to reduce the total time taken to prepare a nanocellulose film to 10 minutes.

Both these developments represent a significant advance in utilising CNF in the production of advanced materials, such as air and liquid filtration systems for industrial and household applications.



Micro Fibrillated Cellulose from Daicel Chem Ltd