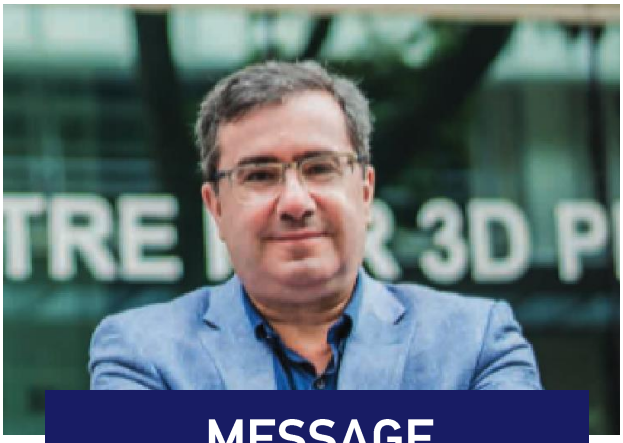
# NEWSLETTER

CHANGING THE WORLD THROUGH ADDITIVE MANUFACTURING



## MESSAGE

Welcome to the latest triannual edition of our research centre newsletter, a platform dedicated to sharing key updates on our exciting activities, impactful partnerships, prestigious awards and upcoming events. Among all the achievements, I would like to highlight the Open House in November celebrating our 10th anniversary, the "Excellence in Additive Manufacturing Talent Development" award from ASTM International and the best "Research Centre of the Year 2024" award from the 3D Printing Industry.

None of these achievements would have been possible without the support of our partners and the dedication of our talented faculties, researchers and staff.

As the year approaches the end, we wish you and your family a very Merry Christmas and a Happy New Year

**Professor Paulo Bartolo**
*Executive Director*

## HIGHLIGHTS


# SC3DP 10TH ANNIVERSARY 2014-2024

On **8 November 2024** the SC3DP celebrated its 10th Anniversary with an Open House and Gala Dinner, marking a decade of pioneering innovation and impactful collaboration. The Open House showcased SC3DP's achievements and transformative contributions to additive manufacturing, setting the stage for a future of continued leadership and impact in the field.

## OPEN HOUSE

It allowed us to share recent advancements in additive manufacturing (e.g. glass printing, multi-material and functionally graded structures, tissue/organ printing, food printing, concrete printing, electronics printing, printing in space, smart and sustainable manufacturing, process digital twins) and ongoing industry collaborations. The event included self-guided lab tours, short seminars and exhibitions from leading companies such as 3D Makerpro, AddUp, Anton Paar, CES_InnovFab, Cetim-Matcor, Chemtron, CNC Design, Eye-2-Eye, Farsoon, Hexagon, HIPEX, Maha Chem, Makino, Malvern Panalytical, Nano Dimension, Obayashi, ST Engineering and ZRapid. The event was attended by around 500 visitors, including members of the public, NTU affiliates and industries.

## NEW CORPORATE VIDEO

The new Corporate Video of the centre was launched during the Open House and can be seen HERE.

It includes testimonies from some of our industrial partners such as CES_Innovfab, Cetim-Matcor, Panasonic Factory Solutions and ST Engineering.

# GALA DINNER

We celebrated this significant milestone by bringing together over 180 influential figures from funding agencies, policymakers, industry partners, and faculty members.

SC3DP received the "Excellence in Additive Manufacturing Talent Development" award from ASTM International in recognition of 10 years of outstanding contributions in nurturing and shaping a new generation of talent in the additive manufacturing industry across Singapore and beyond.

## Awards of Appreciation

*(from left)*

**Professor Paulo Bartolo**
Executive Director, SC3DP

**Dr Zheng Guoying**
Vice President, ST Engineering Aerospace

**Mr Yam Ah Mee**
Chief Executive Officer, Chip Eng Seng Corporation

**Dr Ang Joo Hock**
Assistant Vice President, Seatrium

**Mr Lionel Lim**
Vice President, Economic Development Board

# RESEARCH COLLABORATION

## NTU Singapore & Maha Chemicals (Asia) collaborate on Projection Micro Stereolithography research


SC3DP and Maha Chemicals (Asia) signed a collaboration agreement to further develop projection micro stereolithography. During the next three years, we will organise a range of seminars and applied research projects to promote and further develop the technology.

## Nobula3D

SC3DP has signed a strategic partnership with Nobula 3D, pioneers of an extrusion-based glass 3D printing technology, to integrate advanced glass 3D printing into industrial and medical applications.

SC3DP will further promote technological advancements through events and demonstration projects.

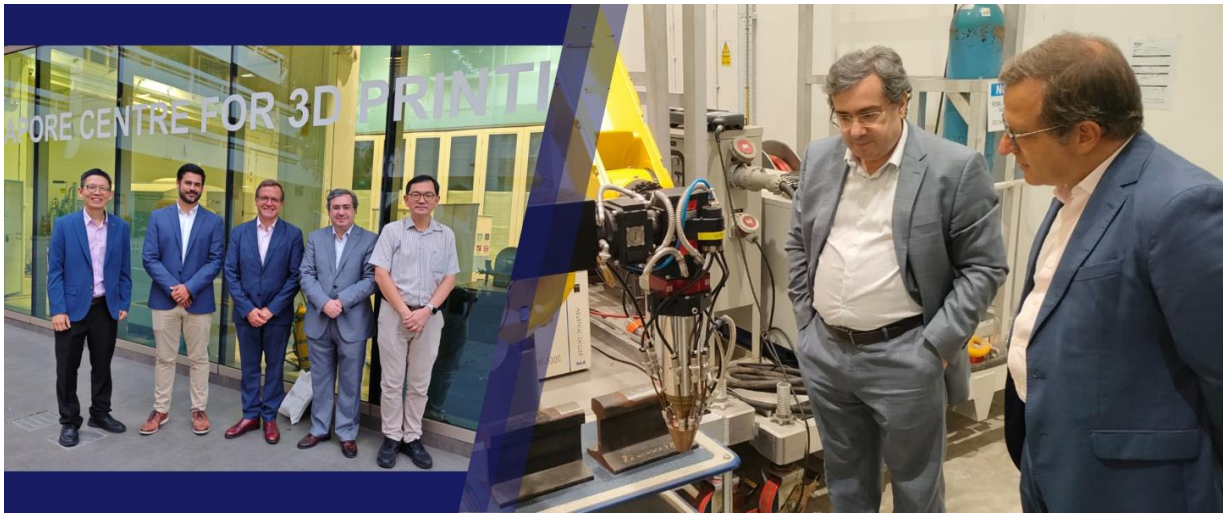

## 3DMakerpro

SC3DP has partnered with 3D Makerpro to advance innovation in additive manufacturing by integrating 3D scanning technologies into industrial and medical applications.

This partnership leverages 3D Makerpro's expertise in scanning and NTU's research capabilities to drive advancements in additive manufacturing.

SC3DP will actively promote these innovations through workshops, seminars, training sessions, and demonstration projects.

# NEWS & EVENTS



## Visit by the Ambassador of Portugal in Singapore

On 30 October 2024, **His Excellency Ambassador Carlos Pires** visited the Singapore Centre for 3D Printing. During his visit, we showcased our main areas of research and highlighted our ongoing collaborations with Portuguese organisations. As Dr Pires recently assumed his role as the Portuguese Ambassador in Singapore, this visit served as an excellent opportunity to discuss new avenues for strengthening ties with Portugal and exploring future partnerships in the field of 3D printing.

## Diplomatic Visit

During SC3DP's Open House we hosted members of the Singapore diplomatic circle.

The delegation included Mr Allen Irwin, Economic Officer, **US** Embassy; Ms Kavitha Mathuvay, Minister (Economic), High Commission of **Malaysia**; Mr Joel Henri Brunner, Science Counselor, Embassy of **Switzerland**; and other senior representatives from the embassies of **Mexico**, **Denmark**, **Japan** and **Ireland**.


# FORMNEXT

FORMNEXT 2024 held in Frankfurt is the leading annual global fair in Additive Manufacturing.

This is the third year that SC3DP has been exhibiting. Leveraging this event to connect with leading industry AM peers, foster relationships with existing partners, and establish new partnerships to explore potential business opportunities.

Industry and academia partners from around the world visited our booth to discuss potential cutting-edge research collaborations in AM. During the event, industry interviews and the signing of collaboration agreements further cemented SC3DP's reputation as one of the leading research centres in the world for additive manufacturing.

# ITAP 2024

SC3DP participated in the Industrial Transformation Asia-Pacific 2024 (ITAP 2024) from 14 to 16 October 2024, showcasing NTU's innovative spirit and engineering excellence.

At our exhibit booth, we highlighted the diverse range of multidisciplinary programs offered by the College of Engineering, alongside SC3DP's cutting-edge research and advancements in additive manufacturing. Through this platform, we engaged with industry leaders and fostered collaborations, reinforcing our commitment to shaping the future of engineering and manufacturing.

# WORKSHOPS & SEMINARS

## Advanced 3D Printing Techniques for Singapore's Industries (28 & 29 November)


SC3DP organised a workshop aimed at engaging Singapore industries, which was attended by over 70 participants. The event featured distinguished speakers from organisations such as EDB, NAMIC, SC3DP, Arkema, ASTM, Autodesk, CETIM-Matcor, HP, I-VTech Solutions, Mencast, Maha, Siemens, SpareParts 3D, and ST Engineering."

### "Practical 3D Printing workshop – Materialise"

This workshop jointly organised with Materialise (23 October) allowed participants to experience hands-on softwares like Mimics and Magics.

From designing to preparing the printing files, the around 50 attendees could listen to expert talks and use cases from invited speakers.

### "Light Bioprinting Workshop"

SC3DP and Cellink, organised a workshop focused on the latest technologies and scientific advancements in light-based bioprinting.
Technical experts and researchers shared their insights following a hands-on experience of bioprinting with Cellink bioinks using the LUMEN X and BIONOVA X to manufacture biological constructs.

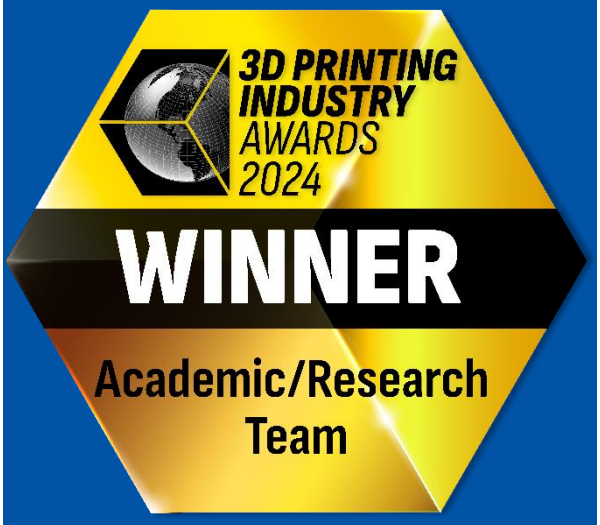

## "Professor *Honoris Causa* award to Prof Paulo Bartolo"

Prof. Paulo Bartolo, Executive Director of SC3DP, was awarded with the Professor *Honoris Causa* title from the Polytechnic University of Leiria. This is the highest distinction the Polytechnic University of Leiria gives a person in recognition of his/her career in the academic, scientific or cultural fields, of his/her values, as well as his/her special link with the institution.

## "Academic/Research Team of the 2024 3D Printing Industry Awards"

The 3D Printing Industry Awards, organised by 3D Printing Industry magazine, celebrate excellence in additive manufacturing and recognise outstanding achievements across various categories. SC3DP was awarded the Academic/Research Team of 2024. Winners are selected through a combination of public votes and expert committee evaluations, highlighting the most impactful innovations and leaders in the 3D printing community.

"*In the year that we are celebrating our 10th anniversary, this an important milestone and the recognition of our role in developing, promoting and pushing the boundaries of additive manufacturing.*" – *Prof Paulo Bartolo*



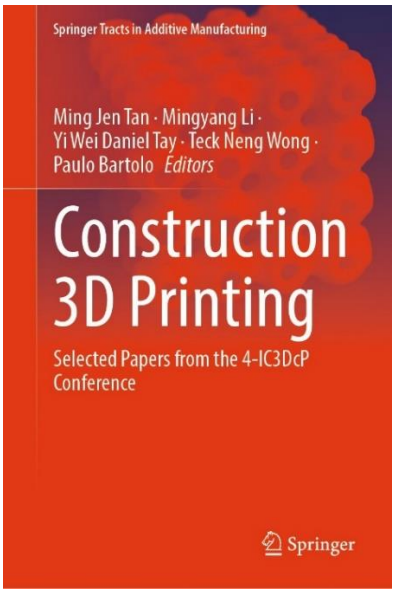

10 YEARS 2014 2024
SC3DP | 2024
Singapore Centre for 3D Printing
Celebrating 10 Years of Innovation

# DISSEMINATION & PROJECTS

## Keynote and Plenary lectures

Researchers from SC3DP delivered keynote and plenary lectures at the 5th International Conference on 3D Construction Printing, Hong Kong; INOV.AM International Conference, Portugal; Rapid Product Development Association of South Africa (RAPDASA 2024), South Africa; 12th CIRP Global Web Conference (CIRPe 2024); and Singapore Healthcare Engineering Conference, Singapore

## Recently published book




## COMING EVENTS

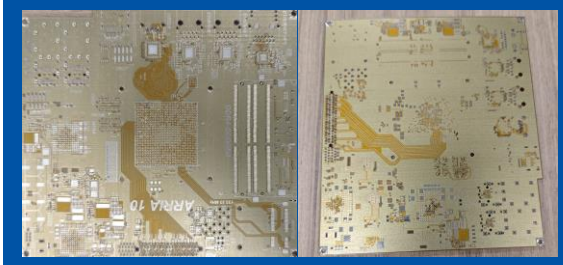
Sustainable manufacturing workshop (March)
Additive Manufacturing pitch competition (June)
Open house & International conference on Design for 3D Printing (September)
ITAP (October)
Formnext (November)

# NEW PROJECTS

We started a total of nine research projects: one project entitled "**Development of a fatigue design methodology and defect tolerance analysis for accelerating metal additive manufacturing part qualification**" (two workpages under SC3DP's responsibility) under the IAF-PP programme (A*STAR); one project "**4D Additive Manufacturing (4DAM) of Smart Structures**" funded by A*STAR; one industrial project titled "**Additive manufacturing of optimized mechanical joints for enhanced construction efficiency and structural performance**" funded by Obayashi; one industrial project titled "**Process and material optimisation for selective laser sintering of polyamide**" funded by ARKEMA; one NAMIC funded project with **Brightsun Marine**; two projects titled "**3D bioprinting decellularised human cornea extracellular matrix to restore eyesight**" and "**Fundamentals of recovery force study toward a 4D Printed scaffold for osteomyelitis treatment**" funded by the Ministry of Education; one project titled "**Development of next-generation metal additively manufactured heat pipes for high-heat flux motor cooling**" funded by the EDB-IPP program with PANASONIC; and the project "**"3D printing electro-adhesive wall climbing robots"** funded by HTX.

# Smart Manufacturing Executive Insight Summit


Jointly hosted by Deloitte, Amazon Web Services (AWS) and Intel Corporation at the Deloitte University Asia Pacific in Singapore, the event brought together over 80 industry leaders, innovators, and experts to explore the future of smart manufacturing. Prof Paulo Bartolo, Executive Director of SC3DP, was invited to participate in a panel to discuss the impact of AI and other digital tools to materialise the organisation's smart manufacturing vision. The other participants in the panel were Ashih Nene (Deloitte), Alpesh Patel (Hyunday), Leigh Madden (Bosch) and Thomas Sennhauser (Intel).



## 16-layer 3D Printed PCB of microcontroller

Dr. Herng Tun Seng utilised 3D printing to fabricate a 16-layer PCB for a microcontroller. The work highlighted key advantages of 3D printing, including faster prototyping, reduced costs, and enhanced performance. This project garnered significant attention on social media and at Formnext. Nanodimension has adopted it as a reference case study.

## A concrete solution to storing carbon

Prof. Ming Jen Tan and a team of researchers at SC3DP in collaboration with ARAMCO (Saudi Arabia) developed a new carbon-capture material for building and construction. The methods involves injecting captured CO2 and steam into concrete during 3D printing, storing the CO2 directly within the structure while enhancing its mechanical strength. This approach improves the durability of 3D-printed concrete.
The project was recently featured bt CNA.

# HEALTH & SAFETY

## Safety & Health Promotional Event 2024

The Safety & Health Promotional Event 2024, held on 20th November, featured presentations on SC3DP's risk management processes by Chester and new OHS guidelines for using personal electronic devices in labs by Lay Ping. The event emphasised the importance of safety protocols and staying updated with the latest guidelines.