

# The Zenith

January, 2022

Volume 5, Issue 1

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# A new platform for controlled design of printed electronics with 2D materials

Scientists have shown how electricity is transported in printed 2D materials, paving the way for design of flexible devices for healthcare and beyond.

A study, published today in *Nature Electronics*, led by Imperial College London and Politecnico di Torino researchers reveals the physical mechanisms responsible for the transport of electricity in printed two-dimensional (2D) materials. The work identifies what properties of 2D material films need to be tweaked to make electronic devices to order, allowing rational design of a new class of high-performance printed and flexible electronics.

Silicon chips are the components that power most of our electronics, from fitness trackers to smartphones. However, their rigid nature limits their use in flexible electronics. Made of single-atom-thick layers, 2D materials can be dispersed in solution and formulated into printable inks, producing ultra-thin films that are extremely flexible, semi-transparent and with novel electronic properties.

This opens up the possibility of new types of devices, such as those that can be integrated into flexible and stretchable materials, like clothes, paper, or even tissues into the human body.

Previously, researchers have built several flexible electronic devices from printed 2D material inks, but these have been one-off 'proof-of-concept' components, built to show how one particular property, such as high electron mobility, light detection, or charge storage can be realised.

However, without knowing which parameters to control in order to design printed 2D material devices, their widespread use has been limited. Now, the international research team have studied how electronic charge is transported in several inkjet-printed films of 2D materials, showing how it is controlled by changes in temperature, magnetic field, and electric field.

The team investigated three typical types of 2D materials: graphene (a 'semimetal' built from a single layer of carbon atoms), molybdenum disulphide (or MoS<sub>2</sub>, a 'semiconductor') and titanium carbide MXene (or Ti<sub>3</sub>C<sub>2</sub>, a metal) and mapped how the behaviour of the electrical charge transport changed under these different conditions.

Lead researcher Dr Felice Torrì, from the Department of Chemistry at Imperial, said: "Our results have a huge impact on the way we understand the transport through networks of two-dimensional materials, enabling not only the controlled design and engineering of future printed electronics based on 2D materials, but also new types of flexible electronic devices.

"For example, our work paves the way to reliable wearable devices suitable for biomedical applications, such as the remote monitoring of patients, or bio-implantable devices for long-term monitoring of degenerative diseases or healing processes."

These future devices could one day replace invasive procedures, such as implanting brain electrodes to monitor degenerative conditions that affect the nervous system. Electrodes can only be implanted on a temporary basis, and are uncomfortable for the patient, whereas a flexible device made of biocompatible 2D materials could be integrated with the brain and provide constant monitoring.

Other potential healthcare applications include wearable devices for monitoring healthcare -- devices like fitness watches, but more integrated with the body, providing sufficiently accurate data to allow doctors to monitor patients without bringing them into hospital for tests.

The relationships the team discovered between 2D material type and the controls on electrical charge transport will help other researchers design printed and flexible 2D material devices with the properties they desire, based on how they need the electrical charge to act.

They could also reveal how to design entirely new types of electrical components impossible using silicon chips, such as transparent components or ones that modify and transmit light in new ways.

Co-author Professor Renato Gonnelli, from the Politecnico di Torino, Italy, said: "The fundamental understanding of how the electrons are transported through networks of 2D materials underpins the way we manufacture printed electronic components. By identifying the mechanisms responsible for such electronic transport, we will be able to achieve the optimum design of high-performance printed electronics."

Co-first author Adrees Arbab, from the Cambridge Graphene Centre and the Department of Chemistry at Imperial, said: "In addition, our study could unleash the new electronic and optoelectronic devices exploiting the innovative properties of graphene and other 2D materials, such as incredibly high mobility, optical transparency, and mechanical strength."

Source: *Imperial College London*  
[www.sciencedaily.com](http://www.sciencedaily.com)

## AICTE-RESEARCH PROMOTION SCHEME (RPS)

- Dr. S. S. Morade got approval for AICTE- Research Promotion Scheme, the proposal amount is 25,00,000/-. The research scheme will play an important role to create research ambience in the institutes by promoting research in engineering sciences and innovations in established and newer technologies; and to generate Master's and Doctoral degree candidates to augment the quality of faculty and research personnel in the department.



## Expert Lecture/Seminars/Courses/Industrial Visits Organized

- Career Development Cell of Department of Electronics and Telecommunication, K. K. Wagh Institute of Engineering Education and Research, Nashik in collaboration with IETE Nashik subcenter conducted webinar on " A Walk through on UPSC-IAS Examination " By Mr. Harshad Dhananjay Bele, Director, Connect India IAS Academy, Nashik On 11th November 2021

K. K. Wagh Education Society's  
**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
Website: [www.engg.kkwagh.edu.in](http://www.engg.kkwagh.edu.in)  
Career Development Cell  
of  
Department of Electronics & Telecommunication  
in collaboration with IETE

Organizes  
Webinar on

**"A Walk through on UPSC-IAS Examination"**  
by  
**Mr. Harshad Dhananjay Bele**  
Director, Connect India IAS Academy, Nashik.

**On 11<sup>th</sup> November 2021  
at 2:00 PM**

**Meeting details:**  
Link: <https://us02web.zoom.us/j/85413268153?pwd=Q3FOd20ybk02eXJ5Z3hoMTgzek04UT09>  
Meeting ID: 854 1326 8153  
Passcode: CivilServ

- A panel discussion was organized in collaboration with IETE Nashik Sub-Center on “Scope and Career Opportunities in Electronics and Telecommunication Engineering” by Mr. Neeraj Ade Sr. Manager, Profound Edutech Pvt. Ltd, Pune. on 20th November 2021

The panelists were from different domain to guide the students about Scope and Career Opportunities in Electronics and Telecommunication Engineering.

1. Prof. Dr. M. S. Sutaone, Deputy Director, College of Engineering Pune
2. Prof. Dr. Varsha Patil, Chair Person, Board of Studies in Computer Engineering, SPPU, Pune,
3. Mr. Shailesh Waghulade, Head, R&D, Siemens India Ltd, Nashik
4. Mr. Sriram Krishnan, Delivery head- Middle East India, Africa and Russia, Thomson Reuters, Bengaluru
5. Mr. Tejas Kshatriya, Associate Vice President, Hybrid Electric Technology, KPIT Technologies Ltd, Pune
6. Ms. Tracy Austina, Head global TTL-tech Varsity TATA Technologies, Pune
7. Ms. Kanishka Thakur, Career Counselor, Strategic Marketer and Personal Branding Consultant Moderator

K. K. Wagh Education Society's  
**K. K. Wagh Institute of Engineering Education and Research, Nashik**  
 Website: www.engg.kkwagh.edu.in

Department of Electronics & Telecommunication  
 in collaboration with IETE  
 Organizes

Panel Discussion on  
 "Scope and Career Opportunities in Electronics and Telecommunication Engineering"

Prof. Dr. M. S. Sutaone, Deputy Director, Coll. of Engg. Pune  
 Prof. Dr. Varsha Patil, Chairperson, Board of Studies in Computer Engineering, SPPU, Pune  
 Mr. Shailesh Waghulade, Head, R&D, Siemens India Ltd, Nashik, India

Mr. Sriram Krishnan, Delivery Head - Middle East, India, Africa and Russia, Thomson Reuters, Bengaluru  
 Mr. Tejas Kshatriya, Associate Vice President, Hybrid Electric Technology, KPIT Technologies Ltd, Pune  
 Ms. Tracy Austina, Head, Global TTL, Technology, TATA Technologies, Pune

Ms. Kanishka Thakur, Career Counselor, Strategic Marketer and Personal Branding Consultant, Moderator

Date: Nov 20<sup>th</sup>, 2021  
 Time: 11:00 AM India

Join Zoom Meeting  
<https://us02web.zoom.us/j/81927284800?pwd=NHh3Wk81bXY4eEtzQWl5YS9Zb09hUT09>  
 Meeting ID: 819 2728 4800 Passcode: entc

For admission related enquiries, please contact: Prof. S.S.Dongare (9021485305) or Prof.K.S. Navale (8237002527)

- Workshop was organized in collaboration with with IETE Nashik Sub-Center on “8051 Interfacing and Programming” conducted by Mr Ashish Bhopale, Partner MicroEmbedded Technologies, Pune on 22th November 2021.

K. K. Wagh Education Society's  
**K. K. Wagh Institute of Engineering Education and Research**  
 Website: www.engg.kkwagh.edu.in

Department of  
**Electronics & Telecommunication Engineering**  
 in collaboration with IETE

Organizes  
 Online Workshop on

**“ 8051 Interfacing and Programming ”** by  
**Mr. Ashish Bhopale,**  
 Partner, MicroEmbedded  
 Technologies, Pune

**Date: Nov 22<sup>nd</sup>, 2021, Time: 11:00 AM India**

Join Zoom Meeting  
<https://us02web.zoom.us/j/89961106118?pwd=K1grTm1qU2NMRI91QUJlTjhUejllUT09>  
**Meeting ID: 899 6110 6118 Passcode: micro**

- Training Placement Cell of Department of Electronics and Telecommunication of K. K. Wagh Institute of Engineering Education & Research, Nashik in collaboration with IETE Nashik subcenter organized a webinar On "Career opportunities for E&TC Engineers in Automation Industry" conducted by Mr. Sunil Chore, India Head Indiasoft Technologies Ltd, Pune on 23rd November 2021.

K. K. Wagh Education Society's  
**K. K. Wagh Institute of Engineering Education and Research, Nashik**  
 Website: www.engg.kkwagh.edu.in

Department of  
**Electronics & Telecommunication Engineering**  
**Training and Placement Cell**  
 Organizes webinar on

**“ Career Opportunities for E&TC Engineers in Automation Industry ”**  
 by  
**Mr. Sunil Chore**  
 India Head Indiasoft Technologies (P) Ltd., Pune

**Date: Nov. 23<sup>rd</sup>, 2021, Time: 03.00 PM to 04:30 PM India**

Join Zoom Meeting  
<https://us02web.zoom.us/j/81791011414?pwd=SUpGT3NjNTg0WHJmbmlHbkIwb2crdz09>  
**Meeting ID: 817 9101 1414 Passcode: automation**

- Webinar was organized on "Computer Networks & Security" conducted by Mr. Yogesh Pawar, Senior Consultant Infosys Ltd. Pune on 29th November 2021.

K. K. Wagh Education Society's  
**K. K. Wagh Institute of Engineering Education and Research**  
 Hirabai Haridas Vidyanageri, Amrutdham, Panchvati, Nashik, Maharashtra-422003  
 Website: www.engg.kkwagh.edu.in  
 (Affiliated To SavitribaiPhule Pune University And Approved By AICTE, New Delhi)

Department of  
**Electronics & Telecommunication Engineering**  
 Organizes  
 Webinar on  
**" Computer Network & Security"**  
 by,  
**Mr.Yogesh Powar**  
 Senior Consultant Infosys Ltd. Hinjewadi Pune.

Time:  
**on 29<sup>th</sup> November 2021 from 02:00 PM to 04.00 PM**  
 Join Zoom Meeting:  
<https://us02web.zoom.us/j/82987039878?pwd=NFJqemdlckh5MUxwVXY0VEJlMFNlZz09>  
 Meeting ID: **829 8703 9878** Passcode: **be2021**

- Department of Electronics & Telecommunication Engineering of K.K.Wagh Institute of Engineering Education and Research, Nashik in collaboration with IETE Nashik Subcenter Organizes Webinar for women on “Challenges for Women in STEM” by Dr. Julie Desai, Lawyer, Mentor & Human Rights Activist On 8th December 2021

K. K. Wagh Education Society's  
**K. K. Wagh Institute of Engineering Education & Research**  
 Website: www.engg.kkwagh.edu.in

Department of Electronics & Telecommunication  
 in collaboration with IETE  
 Organizes  
 Webinar On  
**"Challenges for Women in STEM"**  
 By  
**Dr. Julie Desai**  
 Lawyer, Mentor & Human Rights Activist

Meeting details:  
 Join Zoom Meeting  
<https://us02web.zoom.us/j/89509153375?pwd=S0diRE9CeGZtWHNHbFVLV21NU3FjQT09>  
 Meeting ID: 895 0915 3375  
 Passcode: empower

**On 8<sup>th</sup> December 2021  
 at 3 : 00 PM**

- Workshop was organized in collaboration with with IETE Nashik Sub-Center on “PIC18F4550 Architecture and Interfacing” conducted by Mr Ashish Bhopale, Partner MicroEmbedded Technologies, Pune on 10th December 2021.



K. K. Wagh Education Society's  
**K. K. Wagh Institute of Engineering Education and Research**  
 Website: www.engg.kkwagh.edu.in

Department of Electronics & Telecommunication Engineering in collaboration with IETE

Organizes Online Workshop on

**“PIC18F4550 Architecture and Interfacing”** by

**Mr. Ashish Bhopale,**  
 Partner, MicroEmbedded Technologies, Pune

**Date: Dec.10, 2021 Time: 11:00am India**

Join Zoom Meeting:  
<https://us02web.zoom.us/j/88567544679>pwd=TVZGc3RCdS9GQmlvRDBSQnlvV3llZz09

Meeting ID: 885 6754 4679 Passcode: embedded

Accreditation logos: NAAC, ISO 9001, IETE

- Department of Electronics & Telecommunication Engineering of K. K. Wagh Institute of Engineering Education and Research, Nashik is organized a webinar on “New Product Design Process” by Mr. Uday Karlekar, Operations Head with "Lend A Hand India", Pune on 11th December 2021.



K. K. Wagh Education Society's  
**K. K. Wagh Institute of Engineering Education and Research, Nashik**  
 Website: www.engg.kkwagh.edu.in

Department of Electronics & Telecommunication Engineering in collaboration with IETE

Organizes webinar on

**“New product design process”**

by

**Mr. UDAY KARLEKAR,**  
 Operations Head with “Lend A Hand India”, Pune.

**Date: On 11<sup>th</sup> December 2021 from 11.00 am to 12.30 PM India**

Join Zoom Meeting  
<https://us02web.zoom.us/j/85177561785>pwd=T1ZQVmhSUnMyeGZ0aGh2Wjk2SVRpQT09

Meeting ID: 851 7756 1785 Passcode: epd

Accreditation logos: NAAC, ISO 9001, IETE

- Career Development Cell of Department of Electronics and Telecommunication, K. K. Wagh Institute of Engineering Education and Research, Nashik in collaboration with IETE Nashik subcenter conducted webinar on " How to qualify MPSC " By Mr. Akash Rajaram Dahadade, Assistant Section Officer, Mantralaya, Govt. of Maharashtra.(Secured Tahsildar (Class 1) post in MPSC-2019) On 11th December 2021



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Career Development Cell  
 of  
 Department of Electronics & Telecommunication Engineering  
 in collaboration with IETE  
 Organizes webinar on

**“How to qualify MPSC”**  
 by

**Mr. Akash Rajaram Dahadade,**  
 Assistant Section Officer, Mantralaya, Govt. of Maharashtra.  
 (Secured Tahsildar (Class 1) post in MPSC-2019)

**Date: On 11<sup>th</sup> December 2021 at 2:00 PM India**  
 Join Zoom Meeting  
<https://us02web.zoom.us/j/85307076888?pwd=ZURNOHJFM1Z5WlEyNDZUb09FTEVxdz09>  
 Meeting ID: 853 0707 6888      Passcode: : civilservi

## Industrial Training / Seminar/Workshop done by Staff

- Prof. Dr. D. M. Chandwadkar was the Session Chair Person in 2021 International Conference on Smart Generation Computing, Communication and Networking (SMART GENCON) during 29th and 30th October 2021.



- Ms. M. V. Marathe and Mrs. R. V. Daund have attended the impact lecture on “Innovation and Entrepreneurship” organized by Institution’s Innovation Council (IIC), MIT, Aurangabad on 8<sup>th</sup> November 2021.



- Prof. Dr. D. M. Chandwadkar and Dr. S. A. Patil (Ugale) have attended webinar on " Evolution of Engineering Education" on 12th December, 2021 sponsored by Liquid Instruments and hosted by Electronics for you.



- Prof. Dr. D. M. Chandwadkar and Dr. S. A. Patil (Ugale) have participated in Faculty Development Program on "Artificial Intelligence and Machine Learning for Healthcare" on 13th December, 2021 organized by AICTE Training and Learning (ATAL) Academy.



- Prof. Dr. D. M. Chandwadkar and Mr. P. J. Mondhe was the primary evaluator in "Toycathon 2021" organized by AICTE and Ministry of Educations Innovation Cell Govt of India.



## Paper Presented by Students

- Ms. Shraddha Nandurkar, Ms. Vaishnavi Sanjay Patil and Ms. Mayuri Sinnarkar have presented the paper on “IOT Based Automated Paralysis Assistance” at Department of Electrical Engineering, K. K. Wagh Institute of Engineering Education & Research, Nashik and won 3rd Prize on dated 22nd November 2021.



## Udemy Courses Developed by Staff

- Staff has developed and uploaded different courses on Udemy platform

Sr. No.	Name of Staff	Name of Course	Link
1.	Ms. Mrunal Marathe	Introduction to Testing of VLSI Circuits & Fault Modeling	<a href="https://www.udemy.com/course/introduction-to-testing-of-vlsi-circuits-fault-modeling/">https://www.udemy.com/course/introduction-to-testing-of-vlsi-circuits-fault-modeling/</a>
2.	Mrs. Rohini Vilas Daund	Implementation of ASIC Design Flow using Modelsim	<a href="https://www.udemy.com/course/implementation-of-asic-design-flow-using-modelsim/">https://www.udemy.com/course/implementation-of-asic-design-flow-using-modelsim/</a>

## Alumni Achievement

- Alumnus of Department of Electronics & Telecommunication Engineering, Mr. Rohit Bagad's, Inxu Digital Media Technologies Pvt. Ltd. has been featured as 'Super 30 Companies 2021' in Fortune India Magazine November 2021 Issue.

INXU DIGITAL MEDIA TECHNOLOGIES | SUPER 30 COMPANIES 2021

### “WE ENABLE OUR CLIENTS TO EXPERIENCE THE ENORMOUS POWER OF REGIONAL ADVERTISING,” SAYS ROHIT BAGAD

Inxu Digital Media Technologies was founded in 2013 by three entrepreneurs; Rohit Bagad (Founder & CEO), Trushant Ugalmugale (Co-Founder & COO), and Shashikant Anpat (Co-founder & AVP Products and Inventory). The company was established with a vision to be a global leader in the vernacular language ad-tech space by making internet advertising language-agnostic through technology and innovation. Over the years, Inxu has built several offerings for digital advertisers and publishers, which are now articulated in a consolidated ad-tech platform called 'adgebra'. This platform is India's largest multilingual native advertising platform that empowers businesses to connect, engage and win the trust of billions of digital consumers.

'adgebra' enables brands to target desired audiences and is available in self-serve models. It is the only digital ad-tech platform to support and serve ads in 10 different Indian regional languages. "With our end-to-end regional advertising offerings, we enable brands to tap into the regional content boom that India is witnessing. We enable them to experience the enormous power of regional advertising for deeper consumer resonance," says Rohit Bagad, Founder & CEO, Inxu.

'adgebra' offers not just native ads but also video and rich-media ad formats that presently connect to over 500 million monthly active users via their network of 2000+ partner publishers, managing 15 billion+ monthly ad serving opportunities.

Today, more than 250+ brands advertise month-on-month using the 'adgebra' platform. Some of the top brands the company is working with are 99acres, Motilal Oswal, Coin Switch Kuber, Policybazar, hear.com, Great Learning, etc. The platform is also monetizing millions of daily active users for top publications and news aggregators.

#### About the Founder

Rohit Bagad, Founder & CEO, Inxu, possesses over 18+ years of experience in the technology and digital advertising space with companies like TCS, Webchutney, and Ozone Media. He has diverse experience in building products and media planning for brands. At Inxu, he drives the vision of the company to meet the needs of the ever-changing industry. Beyond day-to-day decision-making, he is actively involved in the product roadmap, client servicing, and sales.



#### Company at a Glance

'adgebra' helps open up a huge and previously untapped market and opportunity for brands by serving ads in 10 different Indian regional languages. Their partnership with the top regional publishers in the country has helped their clients reach their target audience faster. "Matching the language of ad communication to the language of the content on a website has helped brands across industries, providing 3X better results on 'adgebra'.

'adgebra's' intuitive platform also helps brands target precisely with the combination of multilingual advertising capability and multiple targeting options like the audience, device, geography, and sites.

"Over the past three years, 'adgebra' has achieved market leadership in bringing new-age Indian internet users on the radar of digital marketers. We have witnessed a tremendous increase in client demand for our offerings and related capabilities," he adds.

#### Turning Challenges into Opportunities

One of the biggest challenges in the industry is 'non-timely payments.' To overcome this, the company built a 'self-service' model of the 'adgebra' platform, where clients get access to advertising inventory at an almost 70% discounted rate, but they need to make the advance payment. This strategic shift helped them solve their recovery problems. Today, 70% of clients are on the 'self-service' model. They have started focusing on direct clients where campaigns are based on retention mechanisms. This has helped them grow faster.

Speaking about the pandemic, he says, "The company was affected as brands stopped all advertising spends. But we shifted our focus to new sectors that were emerging during the lockdown. We saw an opportunity in onboarding online gaming, health insurance, and share trading platforms as clients as there was a surge in ad spending from them. We also offered discounts to existing brands who continued to spend with us."

With a focused sales approach, they reached the pre-Covid level of business within 6 months. They are grateful to their team as they stick together during difficult times.

#### Future Prospects

The company plans to achieve its goals with a new growth strategy called 'TOP SPIN' that revolves around Scale, People, Investments, and Newness. This strategy will benefit all the stakeholders and strengthen their market position.

"We will continue to focus on Indian regional language advertising. We plan to launch video and voice-based regional language ads for short video and music content providers. We are also planning to expand our footprint beyond India," he says.

Rohit wraps up by saying, "Identifying trends and capitalizing on them with futuristic products will never fail. Have a clear focus and patience for success. If anyone is looking to jump into the current start-up bandwagon, then the best time is NOW."

FORTUNE  
—exchange

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- Alumnus of Department of Electronics & Telecommunication Engineering, Ms. Bidita Paul recognize as “KROWN” The high flyers from KPIT Technologies, Pune



***Published By***

***Department of E&TC***

***K.K. Wagh Institute of Engineering***

***Education & Research, Nashik***

***Hirabai Haridas Vidyanagari,***

***Amrutdham, Panchavati***

***Nashik-422003***

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## **Vision**

Provide quality education to create engineering professionals of global standards by keeping pace with rapidly changing technologies to serve the society.

## **Mission**

M1: To educate the students with the state-of-the-art technologies and value based education to meet the growing challenges of industry.

M2: To provide scholarly ambience & environment for creating competent professionals.

M3: To inculcate awareness towards societal needs.