

7 Patents



7 PUBLICATIONS



120+ campus placements



Team GlucoNIST
Winner of Smart India Hackathon-2020
HARDWARE EDITION (NON-INVASIVE GLUCOMETER) - PR183

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FROM THE EDITOR



This issue coincides with spring, and it rightly has lots of news about the new bloom at NIST. A few members, including our new principal, joined NIST family; our faculty members got 7 patents, published their research on many refereed journals; placement drives on campus was active as ever with over 120 placements in around 1 month; many of our alumni were recognized for their work; our students won Smart India Hackathon - 2020, and we had an industry-academia collaborations with Aximind.

Post Covid, one noteworthy development happened, i.e., our eNews, NIST Chronicle, went almost entirely online. The challenges presented by the global pandemic haven't diminished the quality of academics and research at NIST. We still have a lot of compelling stories to tell about the institute's achievements. That's why we plan to roll out eNews bi-monthly, quarterly and annually. NIST is in turbo mode! Enough of tech, we also plan to bring out an annual literary magazine that'll reflect the creative side of NISTians.

We value you, value your opinions. So, voice whatever you feel like. Please send your feedback, everything from "oh wow" to "oh crap", to connect@nist.edu.

Lovingly,
Manmath Sahu

1 IN FOCUS

1.1 Team NIST Wins Smart India Hackathon 2021



NIST team “GlucoNIST” won Smart India Hackathon 2020 under the “Hardware Edition” of the problem statement “Non-invasive glucometer” (PR183). We congratulate the GlucoNIST team members, Prakash Panigrahi (ECE), Debasish Panda (ECE), Shree Patnaik (ECE), K Devendra Reddy (CSE), Swosti Choudhury (EEE), and Anand Kishen Pujari (ECE), and the mentor Dr. Sandipan Mallik (faculty, ECE) for winning this prestigious national Level award!

Over 100 teams from across the country participated in the hardware edition of Smart India Hackathon-2020. Team NIST won all the levels, and finally demonstrated its prototype device that determines blood sugar level using breath instead of blood. The objective of this prototype is to provide an easy-to-use, effective, low-cost, non-invasive, painless measurement of blood glucose level. The team had already applied for its patent and believes the prototype will soon be turned into a product.

Govt. of India and state governments have been organizing hackathons every year to inculcate a culture of problem solving and product innovation. Such events create a base for many startups that improve governance and quality of life. NIST students have participated in such hackathons every year and often won prizes for their innovative, open and positively disruptive solutions.

1.2 Alumnus Shailaja Got Poiesis Award



Poiesis Online and Xpress Publications conferred NIST graduate (2015) Shailaja Pandey with Poiesis Award for Excellence in Poetry at 10th Rabindranath Tagore International Poetry Contest, 2021. She had an illustrious 3-year stint at Infosys right after graduating from NIST. Now she works at Visa Inc. as a Senior Performance Engineer.

She had a strong inclination towards English literature since her school days. Even while pursuing Engineering at NIST, Berhampur, she did not let her passion take a backseat. She was the co-editor of the NISTIAN, a literary chronicle of the college. Her literary journey finally reached its destination when she won the prestigious Bharat Award for Literature 2021 for her poem titled ‘But God is a Woman’. NIST congratulates Shailaja on her glorious achievement. We are hopeful that this is just the beginning of her stardom and she moves on to become one of the star poets of her generation.

God bless you dear Shailaja.

1.3 NIST Faculty Patents



National Institute of Science and Technology being a pioneer institute in the State of Odisha, and prioritising Research and Development (R&D), has disclosed several inventions. The faculty members have 7 patents to their credit including 2 published in last two months. These patents encompass Electrical,

Electronics, Computer Science, Chemical and Mechanical Engineering, which are filed by our faculty - Dr. Pradyumna Ku Patra, Dr. Rajesh Kumar Patjoshi, Dr. Sandipan Mallik, Dr. Satya Sopan Mahato and Dr. Susanta Kumar Sahu. Undoubtedly, these conspicuous R&D milestones could be accomplished due to the vital contribution of NIST’s research scholars - Manoj Kr Das, Shrabani Guhathakurata and undergraduate students - Abhijeet Choudhury, Ahmad Raja, Ajit Dash, Debasish Panda, Prakash Panigrahi and Syed Habibur Raheman.

1. Metal Protein Semiconductor Structure (2018)
2. A System for Customized Universal DC Circuit Emulation and a Method Thereof (2018)
3. Intelligent Maneuvering Hypolimnetic Aeration System (2018)
4. Smart Card System and Method for Generating and Transmitting Tokens Through Machine Readable Codes (2019)
5. An Automated Probing System for Measuring Electrical Characteristics of On-Wafer Devices and a Method Thereof (2020)
6. Non-Invasive Glucometer to Determine Blood Glucose Level from Mouth Blown Air and a Method Thereof (2021)
7. A Single Microstrip Antenna as Radiator and Reflector (2021)

1.4 Placements in Jan., 2021

120+ campus placements



Date	Company	Students placed	CTC (LPA)
05-01-2021	Cognizant	49	3.6
02-01-2021	TCS	49	3.6
11-01-2021	Deloitte	1	4.5
03-12-2020	Evince Development	2	2.55
19-01-2021	ICICI Bank	13	3.1
11-01-2021	Texas Instruments	1	21
16-12-2020	Knowledge Lens	6	4.5
21-01-2021	Qspiders	6	Internship

1.5 NIST MBA Tops the Region

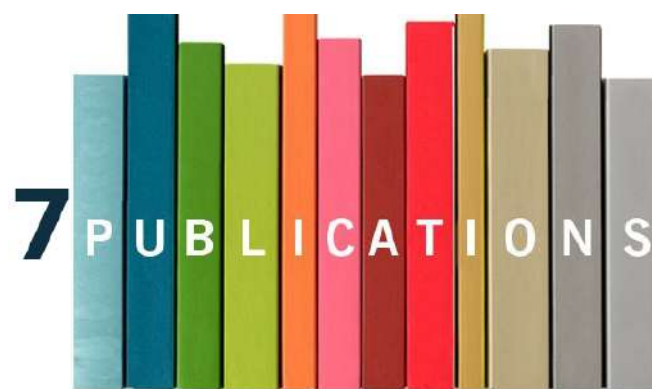


The winning spree continues! Business Standard Business School Survey ranks Department of Management at NIST No.1 in south Odisha, 5th in the state, and 119th in India. Business Standard B-School Survey uses a combination of self-audit by the institutes and an external rating by industry. The final ranking of the business schools that have participated this year has been obtained by arriving at a weighted composite score comprising the audit index and the perception index. The audit index is calculated on the basis of a self-audit (with suitable back-checks) by the B-schools on six different parameters. The perception index is a weighted score arrived at by merging ratings obtained from the industry — alumni and HR professionals.

1.6 Industrial Collab

On 2nd February 2021, NIST entered into an agreement with Aximind to co-innovate in the field of AR/VR, AI, and IoT, with an aim to solve a range of social challenges. The MoU focuses on collaborative projects and research where NIST faculty and students will participate to stay updated with the advancements in 21st century.

2 Research Publications



2.1 Dr. Ranjan Kumar Padhy



Published a research article on “Surfactant Catalyzed Oxidation of Ethanolamines by Cerium(IV)”, Asian Journal of Chemistry; Vol. 33, No. 1 (2021), 21-25.

Abstract: Effect of surfactant medium on the kinetics of oxidation of amino alcohol by cerium(IV) has been reported. Two amino alcohols namely, monoethanolamine (MEA) and

triethanolamine (TEA) are chosen for kinetic study. Sizeable changes in reaction rate are noted only in presence of sodium lauryl sulphate (NaLS) as surfactant. Both the amino alcohols exhibit rate maxima at around the cmc of NaLS, beyond which the k -[NaLS] profile shows slow increase in rate constant with increasing NaLS concentration. Suitable model has been used to explain the kinetic pattern post CMC and from this the micelle-reactant binding constant values have been evaluated. From the temperature dependence study, the activation parameters for the oxidation reactions have been computed and these are compared against those obtained for aqueous medium. Based on all information, plausible mechanism for micellar catalysis has been presented. For more: <https://doi.org/10.14233/ajchem.2021.22907>

He also presented a paper on “Synthesis and Characterization of magnetic nanoparticles for biomedical applications” in 6th International Conference on Nanoscience and Nanotechnology-ICONN-2021 organized by Department of Physics and Nanotechnology, SRM Institute of Science and Technology (SRMIST), India during February 1-3, 2021.

2.2 Dr. Barada Prasad Sethy



“Bearing Capacity of Circular Foundation on a Sand Layer of Limited Thickness Under Eccentrically Inclined Loading.” Soil Mech Found Eng (14th Feb., 2021)

Abstract: Laboratory model test results for the ultimate load of a circular foundation resting on a sand layer of limited thickness underlain by a rigid rough base and subjected to eccentrically

inclined loading are presented. The embedment ratio (to the diameter of the foundation) was varied from zero to one. The load eccentricity and inclination were varied from 0 to 0.150 and 0° to 20°, respectively. Based on the model tests results, a relationship for a reduction factor has been

developed. The reduction factor can be used to estimate the ultimate load for a sand layer with limited thickness from the ultimate load for a sand layer extending to a great depth determined by using the existing conventional theories. For more: <https://doi.org/10.1007/s11204-021-09692-5>

2.3 Sujit Kumar Rout



Satapathy, Soumya Ranjan and Rout, Sujit Kumar, "Enhancement of Soil Properties by Using Polypropylene Fiber: A Review" (January 18, 2021). International Conference on Artificial Intelligence in Manufacturing & Renewable Energy (ICAIMRE) 2019. Abstract: Increasing population, rapid urbanization are forcing the Geotechnical engineers to utilize more and more lands

in construction works such as construction of new roads, buildings etc. But limited availability of suitable soil for construction, become a hurdle in this improvement which leads to the use of lands having CI soils. When it comes the turn of Expansive soil, the problems related due to its poor strength properties roam in our mind, first. In this condition, the need of soil treatment is required badly. In practice, soil treatment is carried out using lime, fly ash, coir fibers etc. frequently while using of polypropylene fiber is very less. Yes, polypropylene fiber is now used in a progressive quantity with concrete, but its uses with soil are limited or very low.

So the main intent of this paper is to study the usefulness of fiber also to observe the out-turn of polypropylene fiber on the geotechnical properties of CI soil. Hence, go through a cycle of laboratory tests with and without the adding of polypropylene fiber to the soil. Tests such as Unconfined Compressive Strength (UCS) and California Bearing Ratio (CBR) tests have been observed with the soil sample mixed with assorted ratio of polypropylene fiber. The results revealed from the tests show satisfactory improvement in strength of soil treated with polyester fiber. For more: <https://ssrn.com/abstract=3768691> and <http://dx.doi.org/10.2139/ssrn.3768691>

2.4 Nilesh Dalai



Nilesh Dalai, P.S. Rama Sreekanth: "UHMWPE / nanodiamond nanocomposites for orthopaedic applications: A novel sandwich configuration based approach Journal of the Mechanical Behavior of Biomedical Materials", Volume 116, April 2021, 104327 (13 January 2021) Abstract: Ultra high molecular weight polyethylene (UHMWPE) remains a

primary choice of material for load bearing applications in total joint arthroplasty. Superior mechanical properties and wear resistance are unique to its performance. However, the addition of nanomaterials has improved its properties significantly. In the present study, a novel sandwich configuration has been considered to achieve unique surface and bulk properties specific to these sandwich composites. UHMWPE was reinforced at various loadings of 0.1, 0.3, 0.5, and 0.7 wt. % by surface modified Nano-diamond (ND). It is observed that the young's modulus, yield stress, fracture stress and toughness of UHMWPE were improved by 15, 31, 30, and 49.6% respectively at the optimum loading of 0.5 wt. % ND filler. The % of elongations and impact strength showed best results at 0.3

wt. % ND. Sandwich nanocomposites were prepared with the optimum loading of 0.3 & 0.5 wt. % ND and assessed for their properties and behaviour. The sectional hardness of sandwich nanocomposites revealed the cross-sectional variation of properties of the material. The reasons for diminution of the mechanical properties of nanocomposites and sandwich nanocomposites were also ascertained by rheological studies. The vibration response, damping behaviour, water contact angle and density of the composites which influence the longevity of the implant material were also assessed. The sandwich composite (PE 0.3ND - PE - PE 0.3ND) has shown better performance in all respect as compare to SW1 and SW3 composite due to good intermingling between the adjacent layers. It is concluded that the existence of ND improved the surface properties and mechanical properties of UHMWPE. However, sandwich nanocomposites have shown better properties unique unto itself. For more: <https://europepmc.org/article/med/33486328>

2.5 Dr. Sushant Kumar Sahu & Dr. Sandipan Mallik



Anupam R. Tripathy, A. Choudhury, Ajit Dash, Prakash Panigrahi, S. Sachin Kumar, P.P. Pancham, Sushanta Kumar Sahu, S. Mallik: Polymer matrix composite engineering for PDMS based capacitive sensors to achieve high-performance and broad-range pressure sensing Applied Surface Science Advances Volume 3, 1 March 2021, 100062 (28 January 2021)

Abstract: Internet of Things (IoT) is increasingly set to be used and implemented in every sphere of technology where low-cost sensors, whose sensing needs are not so rigorous, are required for massive cost reduction.

This article reports the fabrication of

low-cost ZnO Nanoparticles incorporated Polydimethylsiloxane (PDMS)/Porous PDMS stack capacitive pressure sensor, which can be used for low, as well as high-stress monitoring applications. High-performance electrical and mechanical properties have been discerned with the proposed device structure. For a comparative study with conventional geometry, a porous PDMS sensor is also fabricated and characterized. The proposed sensor exhibits non-saturation behaviour even beyond 250 mmHg of the applied load. It also demonstrated the highest failure stress at 2.34 kgf/mm², which could serve as an improvised replacement for other polymer layers under high-stress conditions. The sensitivity of the sensor is found to be 0.38 pF/cm² mmHg at 12 mmHg applied pressure. The performance of the sensor, connecting to an embedded setup prototype involving microcontroller and other electrical components, was also demonstrated by placing objects in incremental order. These values give the proposed sensor high potential as fulfilling one of the vital requirement criteria in the IoT industry. For more: <https://www.sciencedirect.com/science/article/pii/S2666523921000088>

2.6 Dr. Hemant Kumar Reddy



Kumari Renuka, Reddy, K. H., & Roy, D. S. (2021). A counter based approach for reducer placement with augmented Hadoop rack awareness. *Turkish Journal of Electrical Engineering & Computer Sciences*, 29(1), 437-453.

Abstract: With the ever expanding and all pervasive growth of information and communication technologies, vehicular

ad-hoc networks (VANETs) need sophistication. The fifth generation (5G) communication has brought about uncharted bandwidth capabilities SDN have enabled realtime network control while cloud and fog computing have brought unprecedented computation and storage capabilities for leveraging analytics on massive data volumes and bringing down response times. These information and communication technologies can effectively handle the challenges of next generation autonomous vehicular networks including maintaining road disciplines and safety in VANETs. Moreover, energy efficient operations is the key for any upcoming technology: To this end, this paper assumes the use of 5G and fog computing based vehicular network and using SDN controller's cognizance of global vehicular topology, it proposes an SDN enabled location-aware routing that intelligently manages workload at fog nodes for reduced energy consumption while satisfying bandwidth and delay constraints. The VANET energy minimization has been formulated as an integer linear programming problem and simulations have been carried out to test the efficacy of the proposed model and the results show the efficacy of the proposed model's 15.74% of improvement of energy consumption as compared to that of the optimal algorithm. For more: <https://journals.tubitak.gov.tr/elektrik/issues/elk-21-29-1/elk-29-1-28-2001-106.pdf>

3 Webinars & Talks

3.1 Talk on Big Data

On 17-02-2021, Deptt. of CSE, NIST, organised an invited Tech-Talk "Big Data and its Research Applications." Dr. Hemant Reddy, Head of CSE, NIST introduced the speaker, Dr. Padma Lochan Pradhan, SITAM, Vizianagaram. Prof. Pradhan started his talk with Big Data and its application areas. He introduced open source tools related to big data and its usage. Finally, he discussed different research directions that are helpful to faculty members and students. Faculty members of CSE, and M.Tech 1st and 3rd Sem students participated in the talk that ended with a brief QA session.

3.2 Solar PV Webinar

Innovation, Incubation and Industry Collaboration (IIIC) Centre, NIST organized its first technical webinar on "Automatic Solar PV Cleaning System" on 15th February, 2021. A renowned academician in Integrated Renewable Energy System, Power Quality, Power Electronics Applications in renewable energy, Dr. Subho Upadhyay from Dayalbagh Educational Institute (Deemed University) Agra delivered talk on the technical concept on Renewable energy and Dr. Ashwini Ku. Nayak, one of the most active members of the IIIC Centre, coordinated the event. Keeping eyes on current pandemic, NIST is conducted the program in virtual mode through Google meet.



3.3 Outcome-Based Education

NIST faculty members participated in the Awareness Webinar on Outcome-based Education and Accreditation for Engineering Colleges and Deemed to be Universities in Odisha, jointly organised by National Board of Accreditation (NBA) and State Project Implementation Unit (SPIU), Bhubaneswar, Odisha on 18th February, 2021. The webinar was conducted on Cisco Webex Platform. The webinar started with the welcome address by SPIU Project Administrator, Dr. A. Mishra followed by Dr. Chitta Ranjan Tripathy's (Vice Chancellor, Biju Patnaik University of Technology, Rourkela) speech. Dr. Anil Kumar Nassa, Member Secretary, NBA New Delhi, explained the objectives of the webinar. Prof. K.K. Aggarwal, Chairman, NBA, New Delhi, gave inaugural speech. Dr. Anil Kumar Nassa, Member Secretary, NBA, explained the participants NBA Accreditation-Introduction, Assessment Methodology, Guidelines, Benefits, Quality Initiatives, Washington Accord Membership & its Advantages, Renewal of WA Membership, and NBA's future plans. Prof. C.R. Muthukrishnan, Former Deputy Director, IIT, Madras, briefed the Methods of Assessment and Evaluation such as Assessment Tools, Assessment of POs, PSOs, PEOs & COs and thoughts on closing the Loop for Continuous Improvement. Prof R.V. Ranganath, B.M.S. College of Engineering, Bangalore, dealt with Self Assessment Report (SAR) – Overview of changes, How to prepare the SAR and effect Improvements during the process (UG Engineering). The webinar concluded with an Interactive Session (Q/A) with Resource Persons, and Vote of Thanks by Dr. Anil Kumar Nassa.

Must note: India is a permanent signatory member of the Washington Accord on 13 June 2014 for implementing OBE in professional education. The National Board of Accreditation (NBA), a body for promoting international quality standards for technical education in India has started accrediting only the programmes running with OBE. NBA mandates establishing a culture of outcome-based education in institutions that offer Engineering, Pharmacy, Management programs. Outcomes analysis and using the analytical reports to find gaps and carry out continuous improvement is essential cultural shift from how the above programs are run when OBE culture is not embraced. Outcomes analysis requires huge amount of data to be churned and made available at any time, anywhere. Such an access to scalable, accurate, automated and real-time data analysis is possible only if the institute adopts either spreadsheet based measurement system or some kind of home-grown or commercial software system.

3.4 MBA Activities

1. Dept of Management, NIST achieved B2 rank and 5th position in State and 119th in the Country as per Business Standard report and survey by Build Analytical Professional of SAS.
2. Dr. Akankshya Patnaik completed Faculty Development program by NPTEL SWAYAM from September to December, 2020 Session by IIT Kharagpur on “Stress Management”.
3. Dr. Akankshya Patnaik completed Faculty Development program by NPTEL SWAYAM from September to December, 2020 Session by IIT Kharagpur on “Leadership”.
4. Dr. Bhanu Prasad Behera completed Faculty Development program by NPTEL SWAYAM from September to December, 2020 Session by IIT Roorkee on “Project Management for Managers”.
5. Ms. Rojalin Patri completed AICTE Training and Learning(ATAL) Academy online FDP on “Data Analytics in Business Research” from 29-01-2021 to 2-02-2021 at Babasaheb Bhimrao Ambedkar University.
6. MBA and B.Com students participated in a Youtube livestream, “Leadership Lessons”, on 9th Dec., 2020, by Dr. Anil Misra, Chief HR Officer, Magicbricks.com. Dr. Misra shared his career journey and the key learnings with the participants. He told the students how HR can add value to organisations. Must watch: https://youtu.be/TJ_f8s0qg8k

4 Welcome to NIST Family

4.1 Dr. Priyadarshi Tripathy



Dr. Tripathy, fondly known as Piyu, joined NIST Leadership as its Principal. He has a strong Academic career with 17 years of software industry experience in Canada and USA at Nortel Networks, Cisco Systems, Airvana Inc. and NEC Labs at Princeton. Before joining NIST, he worked as a Dean, School of Information & Computer Sciences

(SICS), Ravenshaw University. He has co-authored two textbooks on Software Evolution and Software Testing and Quality Assurance which are being adopted as course text. His research interest is in the area of software engineering and computer networks.

Papers taught: Software Engineering, Software Evolution, Software Testing, Computer Networks, Computer Network Security, Numerical Analysis, Complex Analysis.

4.2 Afreen Ali



Afreen Ali joined us as assistant professor in the department of English. She is also a member of the institute’s admission team. She loves playing badminton and has represented her school and college in various district and state level competitions. She’s a quick learner. She is always after new challenges and thinks out-of-the-box while looking

for creative solutions to a given problem. Afreen believes in character, values, action, and learning from own mistakes. She strongly feels that this virtue will take

her ahead in life and career. Her interests are mostly related to reading novels, listening music and comedy.

4.3 Sarangadhar Hota



Sarangadhar Hota re-joined NIST as Assistant Professor in the department of English. He has 8 years of teaching experience and 5 years of PhD research experience. He has published book chapters, and research articles in national and international journals. His research area of interest includes Colonial and Post-colonial Education System in Odisha, Indian

English Literature and Comparative Literature. He is passionate about teaching and counseling students. Soft skills training became a part of his teaching career and he loves to train students the required skills viz. Interview, Personality Development and communication. He was a Research Associate on an 18-month project “Prison Migration and Sexuality” under ICSSR during his PhD at NIT Rourkela. Teaching and research enrich his life.

4.4 Manoj Kumar Sahoo



Mr. Manoj Kumar Sahoo joined NIST as Assistant Professor in the department of Computer Science and Engineering (CSE). For him it’s homecoming. He is NIST’s foundation batch graduate (batch-2000) and has served as Sr. Faculty (2007-2009). He has done Master in Technology in Electronics Information System under Berhampur University in 2011. He

has Enrolled in Ph.D under the Biju Pattanaik University of Technology, Rourkela, Odisha. He has an Advanced certificate in VLSI design (P.G. Diploma Equivalent) to his credit. He has 7 years of industrial experience in VLSI and EDA tools with 5 years of educational experience. He is also associated with the training and consulting for skill development in FPGA, Embedded, and IoT domains. He has published 9 national and international papers. His area of interest is IoTs, SoC and Reconfiguration System.

4.5 Amarnath Padhy

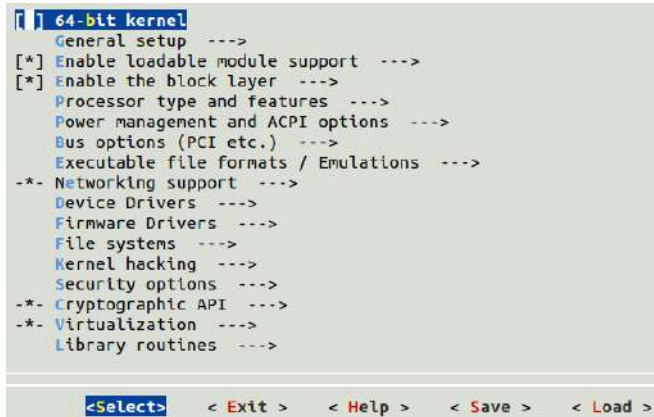


Mr. Amarnath Padhy joined the institute on the 18th Feb., 2021 as Assistant Professor in the Department of Management Studies. He has submitted his Ph.D. thesis to Fakir Mohan University (State University), Balasore, Odisha, specializing in Strategic HRD. He has presented a good number of research articles at national and international conferences

organized by institutions of national repute such as IIM Kozhikode, IIM Visakhapatnam, NIT Rourkela, State Universities, and Deemed to be Universities, and published four research articles in National (UGC-CARE listed) and International peer-reviewed Journals (Scopus Indexed). He has authored a book entitled “Industrial Legislation”. He also attended a number of FDP’s at IIM Ahmedabad, IIT Kharagpur, NIT Jamshedpur, NIT Andhra Pradesh, NIT Surat, NIT Tiruchirapalli, NIT Jalandhar, IGNTU, Amarkantak (Central University),

NITTR Kolkata, AICTE (ATAL) and attended seven refresher courses under the MHRD scheme. His professional affiliation includes Life Member of Indian Society of Technical Education (ISTE), Indian Society for Training and Development (ISTD), Executive Board Member, Research India Foundation. He has had more than 14 years of teaching and administrative experience in reputed educational institutions across Odisha including GIET, Gunupur.

5 Kernel Hack with NIC



Ever thought why a Macbook runs smoother than a similarly speeded laptop, or for that matter why an iPhone works better than flagship models of top brand Android phones? The trick lies in how well the software is integrated with the hardware. The lesser the bloat, the better the experience. Though you don't need to recompile a kernel for your Linux desktop and the stock kernel works for most bog-standard hardware, it's always better to bake your own kernel to squeeze that last drop of performance. For most people it may not make much difference. But it'll be a learning experience. So, what are the benefits of recompiling your own kernel? Many, but most importantly you will:

1. have deep knowledge of the system internals (it will serve you for life)
2. reduce the footprint of the base system (very important if you're using costly SLC SATA DOMs)
3. increase performance where it matters and reduce power consumption (crucial for servers that run 24x7)
4. increase the security of your system (goes without saying, everyone aims for a secure computing experience)

Now that you know kernel recompilation matters, we at NIST Information Center (NIC) will make the job easier for you. Here's the baseline for you to start the process:

1. Choose a Debian or Debian-based (such as Ubuntu) distribution for your system. We've had better success with them than with Fedora or RHEL based distributions. Perhaps that's reason why you see over a thousand different Debian clones.
2. Use the kernel source from the distribution's repository. You might have tough time taming the vanilla kernel from kernel.org
3. Plug-in all your devices/peripherals (keyboard, mouse, joystick, writing pad, wifi card, usb drives, all that you use daily or the ones you might use in recent future). This is crucial because we'll build only just enough modules (drivers and firmware) needed for our system to run use and save hundred of MBs that goes into unnecessary firmware, drivers and language packs.

Next, follow the run. First, create a build environment. Install necessary packages. Note: You might need different versions of some packages as per your distribution.

```
sudo apt install build-essential libncurses-dev
bison flex libssl-dev libelf-dev
```

Pull in the desired version of kernel-source for your system.

```
sudo apt install linux-source-5.7.0
```

Extract the kernel-source and move in to the extracted directory.

```
cd linux-source
```

Get a working kernel config file from your OS.

```
cp -v /boot/config-$(uname -r) .config
```

Patch your kernel. (try -p0 if -p1 gets rejected)

```
patch -p1 < foo.patch
```

Then set right your config so that it doesn't break while building modules.

```
make oldconfig
```

You're left with two options to build a just perfect and tiny kernel:

1. localmodconfig: it will build all modules but not into the kernel. They will be loaded when needed. It's the best option.
2. localyesconfig: it will build everything into the kernel. All the modules will be loaded while booting irrespective of what device is plugged in (such as that wifi dongle, or joystick). It's not recommended.

We'll go with localmodconfig.

```
make localmodconfig
```

Then fine-tune every config option to your liking. The fine-tuning is about choosing proper cpu and I/O scheduler, customizing cpu interrupts, modifying power-saving options, and shedding tonnes of bloat.

```
make menuconfig
```

After you're through menuconfig, check for the following with your favorite text editor, vi or nano, or maybe, pico.

1. Delete the values between the quotes in the following option in .config so that it looks like:

```
CONFIG_SYSTEM_TRUSTED_KEYS = " "
```

2. It is often seen that autofs misbehaves in a custom kernel. So, make sure the .config file has exactly these lines:

```
CONFIG_AUTOFS4_FS=m
CONFIG_AUTOFS_FS=m
```

Double-check if the non-free firmwares are there. You handpick a few and built into the kernel. For example, I had to include firmware "mt7601u.bin" for my Mediatek Ralink wifi card. Edit .config file:

```
CONFIG_EXTRA_FIRMWARE="mt7601u.bin"
CONFIG_EXTRA_FIRMWARE_DIR="/lib/firmware"
```

You're almost done! Now build your kernel.

```
make -j$(nproc) deb-pkg
```

Grab for yourself a coffee and relax. It may take several minutes to build. The system may sound noisy while compiling. It's expected, nothing to panic. When it's done, install the recompiled packages.

```
dpkg -i linux-image*.deb
```

Happy hacking!

6 A Poem at Last

Here's the poem that brought our alumnus, Shailaja, Bharat Award. She could not stop herself after reading about atrocities against women. The experience was purgatory. It's a catch-22 position – we personify the sources of our wellbeing to a Goddess and yet everyday we oppress the women. This intellectual dishonesty must go! Now, read on.



But God is a Woman

When she spoke her mind, they called her sassy,
 When she took the help at work, they called her bossy.
 They forbid her to enter temples when menstruating - it was an omen,
 But their scriptures stated that God is a woman.

When her neckline plunged, so did their gaze,
 Even threatened to set her on fire ablaze!
 Did not hesitate to demean her and called her out openly in brawl,
 For for them God is a Woman after all.

When she put on cosmetics and dressed up,
 They said that's when her morals sloshed up.
 But behold, I saw them buying Kohl and lipstick,
 As their God who is a Woman gets appeased, if they offer cosmetics.

They would not promote her and doubt her skill.
 Despite proving her mettle, all she got was a nill!
 Her knowledge and expertise were profound, but was considered a weakling,
 And God of Knowledge is a Woman in the scriptures finding.

Only males can be the breadwinner
 And if a woman steps out of home - she is a sinner.
 She was given the last morsel after everyone's fed,
 But God of Wealth and Food is a Woman is what they said.

The worshipped Mother Earth and Mother Nature,
 But that local woman had to run from pillar to post
 To get treatment like a normal creature.
 So it's established I guess - God is a woman, but woman is neither
 A God nor a human in "Mankind's" current feature.