MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(UGC-AUTONOMOUS)

Affiliated to JNTUA, Ananthapuramu & Approved by AICTE, New Delhi
Recognized Research Center, Accredited by NBA, NAAC for CSE, ECE, EEE, ME & MBA
World Bank Funded Institute, Recognized by UGC under the sections 2(f) and 12(B) of the UGC act1956
Recognized as Scientific & Industrial Research Organization by DSIR of DST

Department of Electronics and Communication Engineering

Faculty Achievements (Academic Year 2016- 2017)

List of Funded Research Project Grants Received:

S.No	Name of the Principal Investigator	Sanctioned Letter Number with date	Funding Agency	Project Title	Duration of the Project	Total Sanctioned Amount	Status of Project
1.	Dr. M. Thamarai	TEQIP-II/Seed Grant/MITS/Dec 2016	Institute Funded	Smart Tube Light System	6 months	50,000.00	Completed
2.	Dr. N. Sathees Kumar	TEQIP-II/Seed Grant/MITS/Dec 2016	Institute Funded	Fundamental Analysis on ECU Signals for the Development of Fault Diagnosis System Using Artificial Neural Networks	6 months	55,000.00	Completed
3.	Mrs. S. Usha Rani	TEQIP-II/Seed Grant/MITS/Dec 2016	Institute Funded	Object Tracking using Particle Filter	6 months	47,500.00	Completed
4.	Mr. R. Ravindraiah	TEQIP-II/Seed Grant/MITS/Dec 2016	Institute Funded	Lesion Detection in Diabetic Retinagraphy Images using Kernal Induced Spatial Fuzzy Clustering Approach	6 months	50,000.00	Completed

List of Book Chapter Publications

The faculties who have published chapters in book during the academic year 2016-2017 are listed below:

S.No	Name(s) of Author(s)	Title of the Paper	Name of the Journal/Conference/ Book	Vol. No/ Issue No. /Page. No/ Month/ Year	DOI/ISSN	Publisher /Indexing	Impact Factor	Citation
1.	Sarwesh P., N. Shekar V. Shet and K. Chandrasekaran	Energy Efficient Network Architecture for IoT Applications	Springer, Book Chapter	pp. 119-144.	ISBN 978-3-319- 50758-3	SCOPUS	--	8
2.	Sarwesh P., N. Shekar V. Shet and K. Chandrasekaran	Energy Efficient Network Architecture for IoT Applications	Springer, Book Chapter	pp. 35-61	ISBN 978-3-319- 49736-5,	SCOPUS	--	1

List of Journal Publications:

The faculties who have published papers in various International journals during the academic year 2016-2017 are listed below:

S.No.	Name(s) of Author(s)	Title of the Paper	Name of the Journal/Confere nce/ Book	Vol. No/ Issue No. /Page. No/ Month/ Year	DOI/ISSN	Publisher /Indexing	Impact Factor	Citation
1	Nagarjuna Reddy A., Hari Krishnan G., Raghuram D.	Real time patient health monitoring using raspberry PI	Research Journal of Pharmaceutical, Biological and Chemical Sciences	7/6/570-575/12-2016	ISSN: 0975-8585	RJPBCS/S copus	--	--
2	Thamarai M., Shanmugalakshmi R.	Video coding technique with multi objective particle swarm optimization and EZW	Journal of Electrical Engineering and Technology	11/5/1404-1411/6/year 2016	DOI: 10.5370/JEET.20 16.11.5.1404/ ISSN: 2093-7423	Korea Publisher/ Scopus	0.28	--
3	Sai Sanath Kumar K., Naveen Kumar Reddy K., Pushpavathy V., Raja Reddy P., Sharma D., Sharma P.K., Vamsi Krishna, B.	Calculation of path losses at CM3 for wireless body area networks (WBAN) by using different types of antennas	International Journal of Applied Engineering Research	11/7/5210-5217/May,2 016	ISSN: 0973-4562	RIP/ Scopus	--	2
4	Thamarai M., Mohanbabu K.	An improved image fusion and segmentation using FLICM with GA for medical diagnosis	Indian Journal of Science and Technology	9/12/1-10/March,20 16	DOI: 10.17485/ijst/20 1 6/v9i12/88176 ISSN: 0974-5645	SJR/SCI	5.07	1

					DOI			
5	Sakthisudhan K., Saravana Kumar N.	Certain Study on Improvement of Bandwidth in 3 GHz Microstrip Patch Antenna Designs and Implemented on Monostatic Radar Approach for Breast Cancer Diagnosis in Microwave Imaging System	Journal of Circuits, Systems and Computers	25/2/ 1650006-32/2016	DOI: 10.1142/S0218126616500067 ISSN: 1793-6454	World Scientific/ SCI	0.595	1
6	Sreenivasulu, U., Naganjaneyulu P.V., Giriprasad, M.N.	Achieving QoS requirements using evolutionary computation scheduling schemes in 802.16 networks	Journal of Theoretical and Applied Information Technology	Vol no 83/ Issue no 3/Page no 345-352/January, 2016	ISSN: 1992-8645	JATIT/ Scopus	--	--
7	Manjula T., Sreenivasulu U., Javeed Hussain S.	A dynamic raspberry Pi sense HAT multimodality alerting system by using AWS IoT	Indian Journal of Science and Technology	Vol no 9/ Issue no 39/Page no 1-8/October, 2016	DOI: 10.17485/ijst/2016/v9i39/9579/ ISSN (Print): 0974-6846	IJST/ E-SCI	--	--
8	Prasad E.L., Reddy A.R., Prasad M.N.G.	EFASBRAN: Error Free Adaptive Shared Buffer Router Architecture for Network on Chip	Procedia Computer Science	Vol:89/ Issue:7/ Pg. no:261- 270	DOI:/10.1016/j.procs.2016.06.056 G et /ISSN:1877-0509	ELSEVIER / Scopus	--	2
9	Ravindraiah R., Chandra Mohan Reddy S., Rajendra Prasad P.	Detection of exudates in Diabetic Retinopathy images using laplacian kernel induced spatial FCM clustering algorithm	Indian Journal of Science and Technology,	Vol no:9/ Issue no:15/ Pg. no:1-16/April, 2016	DOI: 10.17485/ijst/2016/v9i15/88171/ ISSN: 0974-6846	IJST/E-SCI	--	2
10	Hussain S.A., Ramaiah C., Prabhu M. Javeed Hussain S.	Robot Manipulator with a tactile sensor for object Recognition in Industrial welding process	International Journal of Control Theory and Applications	Vol:9 Issue:11 Pg. no:8373-8381/2016	ISSN: 0974-5572	Internation al Science Press/ Scopus	--	--
11	Darwin Jose Raju A., Solai Manohar S., Senthil Kumaran M	A simple analytical method for calculating the optimal value of inductance of sine and cosine shaped spiral inductors and its analysis using	RevistaTecnica de la Facultad de Ingenieria Universidad del	Vol:39 Issue:7 Pg. no:134-143/November, 2016	DOI: 10.21311/001.39.7.17/ ISSN: 0254-	Universida d del Zulia/ Scopus	--	--

		ANOVA method	Zulia		0770			
12	Bappadittya Roy, A.Bhattacharya, S.K.Chowdhury and A.K. Bhattacharjee-	Wideband Snowflake slot antenna using Koch iteration technique for wireless and C- band applications	International Journal of Electronics and Communications (AEÜ)	Vol 70, Dec.2016, pp.1467- 1472	DOI:10.1016/j.a e ue.2016.08.010	SCI	2.11	2
13	Bappadittya Roy, U.Chakraborty, S.K.Chowdhury and A.K. Bhattacharjee	Design of U-Shaped Antenna Using Different Substrate With Enhanced Bandwidth for WLAN/WiMAX Application	Microwave and Optical Technology Letters	Vol.58, pp.959-963, oct.2016	DOI: 10.1002/mo p.29702	SCI	.585	1
14	Ankan.Bhattachary a ,Bappadittya Roy, S.K.Chowdhury and A.K. Bhattacharjee	Design and Analysis of a Koch Snowflake Fractal Monopole Antenna for Wideband Communication	Applied Computational Electromagnetics SOC Journal	Vol.3 2, pp.548-554,June 2017.	ISSN:1054-4887	SCI	1	1
15	Bappadittya Roy, A. Bhattacharya, S. Mondal, U. Chakraborty, S. K. Chowdhury, A. K. Bhattacharjee	Size miniaturization of microstrip antenna embedded with open-ended ground slots.	Journal of Computational Electronics	Vol.16,No. 3,Feb.2017 ,pp.907–912,	DOI 10.1007/s108 25-017-0995-6	SCI	1.43	1
16	A.Bhattacharya , B.Roy, K.Chowdhury, A.K.Bhattacharjee.	Compact slotted UWB monopole antenna with tuneable band-notch characteristics	MicrowOptTechn ol Lett.	Vol.59, Feb.2017. pp.2358–2365	DOI: 10.1002/mo p.30730	SCI	.585	2
17	Ankan.Bhattachar y a ,Bappadittya Roy, S.K.Chowdhury and A.K. Bhattacharjee	A Compact Fractal Monopole Antenna with Defected Ground Structure for Wideband Communication	Applied Computational Electromagnetic s SOC Journal	Vol. 1, No. 8. March2016, pp 228-231	ISSN:1054-4887	sci	1	1

18	P. Upadhyay, R. Kar, D. Mandal, S. P. Ghoshal	A new design method based on Firefly Algorithm for IIR System Identification Problem	Journal of King Saud University – Engineering Sciences	Vol. 28, No. 2, pp. 174-198, July, 2016	https://doi.org/10.1016/j.jksues.201 4.03.001 ISSN: 1018-3639	Elsevier/ Scopus	--	20
19	P. Upadhyay, R. Kar, D. Mandal, S. P. Ghoshal	A Novel Low Power 8T SRAM Cell Design Using Lower and Upper Self controllable Voltage Level Techniques in 45 nm Technology	International Journal of Computer Aided	Vol. 8, No. 4, pp. 388-412,	https://doi.org/101504/IJCAET.2016.079390 ISSN-1757-2657	Inderscience/ Scopus	--	--
20	Lucky Agarwal, Brijesh Kumar Singh, Shweta Tripathi and P.Chakrabarti	Fabrication and characterization of Pd/Cu doped ZnO/Si and Ni/Cu doped ZnO/Si Schottky Diodes	Thin solid films	34, 259-266, Aug-2016	https://doi.org/10.1016/j.tsf.2016.06.027/ 0040-6090	Elsevier	1.82	12
21	P Kumar and B. Bhowmick	2D analytical model for surface Potential based electric field and impact of wok function in DMG SB MOSFET	Superlattices and Microstructures	109/1/805-815	DOI: 10.1016/j.spmi.2017.06.001	Elsevier	2.118	--
22	P Kumar and B. Bhowmick	2-D analytical modeling for Electrostatic potential and threshold voltage of a dual workfunction gate Schottky barrier MOSFET	Journal of Computational Electronics	16/3/658-665	10.1007/s10825-017-1011-x	Springer	1.104	--
23	Vijayvargiya V. and Vishvakarma S.K.	Analog/RF Performance attributes of an underlap tunnel field effect transistor for low power applications	IET Electronics Letters	vol. 52, no. 7, pp. 559-560	10.1109/TNANO.2014.2336812 and ISSN: 1536125X	IEEE/SCI	1.23	7

24	Reniwal B., Vijayvargiya V., Vishvakarma S.K. and Dwivedi D.	Ultra-Fast current mode sense amplifier for small ICELL SRAM in FinFET with improved offset tolerance	Circuits, Systems and Signal Processing (CSSP)	vol.35, no.9, pp.3066-3085, Sep2016	DOI:10.1007/s 00 034-015-0199-x and ISSN: 0278-081X	Springer/S CI	1.998	2
25	Vijayvargiya V. and VishvakarmaS.K	Impact of Device Engineering on Analog/RF Performances of Tunnel Field Effect Transistor	Journal of Semiconductor, Science and Technology, IOP journal	vol.32, no.1, pp.1-10, May2017	DOI:10.108 8/1361-6641/aa66b d	IOP\SCI	2.28	3
26	Sachan, Vikash, Ravi Shankar, and Ritesh Kumar Mishra	Selective Decode-Forward Cooperative Communication over Nakagami-m Fading Channel with Channel Estimation Error	Journal of Telecommunicati on, Electronic and Computer Engineering	9, no. 2-6 (2017): 85-90	DOI: 10.1088/136 1-6641/aa66bd	UEM PRESS/ SCOPUS	- -	01
27	Ravi Shankar, Vikash Sachan and Ritesh Kumar Mishra	MIMO STBC Multi Node Selective C(0) Protocol Based Cooperative Wireless Communication over Nakagami-m Fading Channel Considering the Effect of Channel Estimation Error	Journal of Engineering and Applied Sciences	vol. 12, pp. 1859-1863	doi:10.3923/jeas ci.2017.1859.18 63	JEAS/SCO PUS	- -	01
28	R Kumar, A Kumar, G Singh, HN Lee	Efficient compression technique based on temporal modelling of ECG signal using principle component analysis	IET Science, Measurement & Technology	11 (3), 346-353, 1/2017	10.1049/iet-smt.2016.036 0 / 1751-8830	IET /SCI	1.34	1
29	Chandramauleswar Roy and Aminul Islam	TG Based 2T2M RRAM Using Memristor as Memory Element	Indian Journal of Science and Technology	vol. 9, no. 33, pp. 1-5, Sep. 2016	0974-6846. 0974-5645	Scopus	0.86	4

30	Chandramauleswar Roy and Aminul Islam	Design of 10T SRAM Cell using Column- Line Assist and DTMOS Techniques	Indian Journal of Science and Technology	vol. 9, no. 40, pp. 1-6, Oct. 2016.	0974-6846. 0974-5645	Scopus	0.86	1
31	Chandramauleshwr Roy, Arundhati Bhattacharya, Aminul Islam,	Modeling of MTJ and its validation using nanoscale MRAM bitcell	Journal of Engineering Science and Technology	vol. 12, no. 6, pp. 1525 – 1540, Jun. 2017.	1823-4690	ESCI and Scopus	0.37	1
32	Dheeren Ku Mahapatra and LakshiProsad Roy	Empirical Model for SAR Ground Clutter Data	IET Signal Processing	vol. 11, no. 7, pp. 805–813, April 2017	10.1049/iet-spr.2016.03 51	IET/ SCI	1.250	--
33	Dheeren Ku Mahapatra, Soumya Shubhra Ray and LakshiProsad Roy	Maximum A Posteriori Based Texture Estimation by Despeckling of SAR Clutter Amplitude Data	IET Image Processing	vol. 11, no. 8, pp. 656–666, May 2017	10.1049/iet-ipr.2017.034 4	IET/ SCI	1.401	1
34	Satrughan Kumar, Jigyendra Sen Yadav	Background Subtraction Method for Object Detection and Tracking	Advances in Intelligent Systems and Computing	479,1057-1063, Sep-2016	https://doi.org/ 10. 1007/978-981-10-1708-7_125 ISBN: 978-981-10-1708-7	Springer/Sc opus	- -	3
35	S. Hoque and W. Arif	Performance analysis of cognitive radio networks with generalized call holding time distribution of secondary user	Telecommunicati on Systems	vol. 66, no.1, pp. 95-108, 2017	https://doi.org/10. 1007/s1123	SCIE	1.527	07

36	Pratik Mondal and S.K.Parui	Multi-Mode Resonator based Broadband Power Divider, Tunableupto UWB	Microwave and Optical Technology Letter, Wiley	Vol. 58, No. 10, pp. 2419-2422, 2016	https://doi.org/10.1002/mop.30063	Wiley / SCI	0.948	2
37	Singh, V.K., Sharma, G. and Kumar, M	Compressed sensing based acoustic event detection in protected area networks with wireless multimedia sensors	Multimedia Tools and Applications Springer	September 2017, Volume 76, Issue 18, pp 18531–18555	10.1007/s11042-016-4241-1 ISSN: 1573-7721	SCI	1.54	8
38	Sitharthan, R., Devabalaji, K.R. and Jees, A	An Levenberg–Marquardt trained feed-forward back-propagation based intelligent pitch angle controller for wind generation system	Renewable Energy Focus	22, pp.24-32.		Elseiver/Scopus	--	--
39	S. M. Chowdhury, A. Hossain and Sunandita Debnath	Impact of Error Control Code on Characteristic Distance in Wireless Sensor Network	Wireless Personal Communications	Vol. No. 92/ Issue No.4/ Page. No. 1459–1471/ February/ 2017	10.1007/s11277-016-3615-z/ 1572-834X	Springer/ SCI	1.200	1
40	Sunandita Debnath, A. K. Singh and A. Hossain	A Comprehensive Survey of Coverage Problem and Efficient Sensor Deployment Strategies in Wireless Sensor Networks	Indian Journal of science and Technology	Vol. No. 9/Issue No.45/ December/ 2016	10.17485/ijst/2016/v9i45/99032/ 0974-5645	Thomson Reuters Indexed (Web of Science)	--	8
41	Sarwesh P., N. Shekar V. Shet and K. Chandrasekaran	Effective Integration of Reliable Routing Mechanism and Energy Efficient Node Placement Technique for Low Power IoT Networks	International Journal of Grid and High-Performance Computing	Volume 9, Issue 4, Article 2, 250117-012241.		ESCI, Scopus	--	3

42	L Kumar, VS Pandey, H Parthasarathy, V Shrimali, G Varshney	Effect of non-linear capacitance on a non- uniform transmission line	European Physical Journal Plus	Vol. No. 131 Issue No. 5 Page No. 159 Month/Year May/2016	10.1140/epjp/i2 01 6-16159-6 ISSN: 2190-5444	Springer/S CI	2.240	3
43	Gaurav Varshney, VS Pandey, RS Yaduvanshi, Lalit Kumar	Wide band circularly polarized dielectric resonator antenna with stair-shaped slot excitation	IEEE Transactions on Antennas and Propagation	Vol. No. 65 Issue No. 3 Page No. 1380-1383 Month/Year March/2017	10.1109/TAP.2 01 6.2635619 ISSN: 1558-2221	IEEE/SCI	4.13	23
44	L Kumar, VS Pandey, H Parthasarathy, V Shrimali, G Varshney	Quantum-mechanical estimation of rectangular waveguide parameters with atomic entropy computation	European Physical Journal Plus	Vol. No. 132 Issue No.285 Page No.159 Month/Year May/2017	10.1140/epjp/i2 01 7-11558-9 ISSN: 2190-5444	Springer/S CI	2.240	2
45	Gaurav Varshney, VS Pandey, RS Yaduvanshi	Dual-band fan-blade-shaped circularly polarised dielectric resonator antenna	IET Microwave Antennas and Propagation	Vol. No. 11 Issue No. 13 Page No. 1868-1871 Month/Year July/2017	10.1049/iet-map.2017.024 4 ISSN 1751-8725	IET/SCI	1.739	8
46	Sankalita Biswas, Biswajit Ghosh, Aniruddha Chandra, Sanjay Dhar Roy	Frame Error Rate for Single Hop and Dual Hop Transmissions in 802.15.4 LoWPANs	International Journal of Electronics	Vol.No-104 IssueNo.-8 May, 2017	DOI: 10.1080/002072 1 7.2017.1312706	Publisher-Taylor and Francis Indexing-SCI	0.939	

Faculty interaction outside world :

S.No	Name of the Faculty member	Qualification	Designation	Type of Assignment	Details of Assignment	Period
1.	Dr. M. Thamarai	Ph.D.	Sr.Asst. Professor	Reviewer	Journal of Electrical engineering and technology	26-12-2016
2.	Dr. M. Thamarai	Ph.D.	Sr.Asst. Professor	Editorial member	International Journal of Intelligent information system	26-12-2016
3.	Dr. M. Thamarai	Ph.D.	Sr.Asst. Professor	Guest Editor Member and reviewer	Science Journal of Circuit and systems and signal processing.	26-12-2016
4.	Dr. S.A. Jilani	Ph.D.	Professor	Reviewer	Multimedia tool and applications: Springer	23-09-2016
5.	Dr.T. Sudhakar	Ph.D.	Sr.Asst. Professor	Reviewer	IEEE Transaction on Medical Imaging	28-12-2016
6.	Dr. Gopiram. H	Ph.D.	Sr.Asst. Professor	Reviewer	- Electronics letters- 8-10-2016 - IET Microwaves, Antennas & review- 27-09-2016 - IEEE Access-9-9-2016 - Neural Computing and Application -13-09-2016 - Ain Shams Engineering Journal - 28-08-2016 - Engineering Science and technology-15-10-2016	2016

S.No	Name of the Faculty member	Qualification	Designation	Type of Assignment	Details of Assignment	Period
7.	Dr. K. R Kashwan	Ph.D.	Professor	Ph.D Viva Board Meeting	Attended in the capacity of chairman of the Doctoral Committee to conduct meeting to assess program of research scholarconducting viva-voce exam. Sona college of technology ,Salem-Tamil Nadu.	1-06-2016

Workshops Organized:

The list of faculties who have organized workshop in the academic year 2016-2017 are listed as follows:

Date	Topic	Resource Person Name and Address	Organizer Name
19th to 24th Sep. 2016	Six Day Workshop on "Smart Antenna Design & Analysis for MIMO Wireless Systems" (sponsored by TEQIP II)	Mr. Kirti Keshav, Manager, Cisco Systems, Bangalore, Mr. Bhawani Shanker Bhati, Research Scholar, Indian Institute of Science, Bangalore, and Professor Dr. A. R. Reddy, HoD/ECE, Conveners	ECE Department, MITS
17-10-2016 to 19-10-2016.	FDP on "Embedded System Program with MSP430" (in coordination with the Industry Institute Interactive Cell (IIIC) and sponsored by TEQIP-II)	Mr. R P Chetan, Director-ERT Tech. Services, Bangalore	ECE Department, MITS
3rd & 4th March, 2017	Two Days Workshop on Microcontroller Programming using MSP-430 (in association with STARCOM & TI University Program under TEQIP II)	Mr M Narendra Babu, Senior Application Engineer, Starcom Technologies Pvt., Ltd.	ECE Department, MITS

Guest Lectures and Seminars organized:

Date	Topic	Resource Person Name and Address	Organizer Name/ Level of the Event
4th March, 2016	One day seminar on RFID Technology	Mr. M. Jagadeesh Babu Assistant Professor, Dept. of ECE, MITS	ECE Department, MITS
20th July, 2016	A Guest Lecture on Research, Patent and Publish: A tutorial	Dr. Dinesh K Avnekar, Former Senior Engineer, Honeywell Technologies Ltd., Bangalore	ECE Department, MITS
18th August, 2016	One Day Guest lecture on Application of Artificial Intelligence	Prof. Dr. V. Gopinath, Info College of Engineering, Coimbatore	ECE Department, MITS
12th October 2016	One day Guest lecture on Digital Communication	S G. Vignesh Arumugam, AP/FX Engineering College, Tiruneleli, Tamilnadu, India	ECE Department, MITS
14th October 2016	A Guest Lecture on "Analog VLSI Design"	Mr. Venkateshappayya, former Service and Production Engineer, Belax UPS Systems, Bangalore	ISTE Students Chapter/ Institute Level
8th and 9th March 2017	Two Day Guest lecture on Projects Work and Real Time System's (under TEQIP II)	Prof. M. Radhakrishna Prof. and Head (Retd.), Indian Institute of Information Technology Allahabad	ECE department, MITS
28th March, 2017	One day Guest Lecture on "Building a Career in Embedded Systems Domain'' (under TEQIP II)	Mr. R P Chetan, Director-ERT Tech. Services, Bangalore.	ISTE Students Chapter/ Institute Level

15th April, 2017	One Day Guest lecture on Advanced Electronic Systems	Mr. Hari Krishnan, Advanced Electronic Systems, Bengaluru	ECE department, MITS

Technical Symposium organized:

Date	Topic	Resource Person Name and Address	Organizer Name/ Level of the Event
17th April 2017	One Day National Level Technical Symposium & Project Expo (IEEE-SS 12 project competition)	Dr. P. Cyril Prasanna Raj Dean(R&D), MS Engineering College, Bangalore.	IEEE Students Chapter& ISTE Students Chapter/ National Level

Hands on Training/ Awareness Programme:

The list of hands-on training/awareness programme organized by the ECE department in the academic year 2016-2017 are listed as follows:

1. A one day awareness program on Global Warming was conducted in MITS organized by Electronics and Communication Engineering department on 8th March 2017. The resource person was Mr. Prashanth Naidu, Social welfare/ Entrepreneur, Madanapalle.
2. A one day awareness program on Ethical Hacking was conducted in MITS organized by Electronics and Communication Engineering department on 12th July 2016.

Technical Magazines:
- Dr. M. Thamarai , HOD in ECE Department and J. Gururaj and K. Jeevitha, Final year students published a Technical Magazine named "PULSE17" in December 2017.