Bio-Data

- Name : Mrinal Kanti Mandal
- Broad subject area : Engineering Sciences.
- Area of specialization : RF and Microwave Engineering
- Contact details: email: mkmandal@ece.iitkgp.ernet.in, mkmandal@ieee.org.
  Ph. No.: 03222-283550 (O)
- Mailing address : A-205, Department of E & ECE,
  I.I.T. Kharagpur,
  West Bengal, 721302.

- Current Status:
  Assistant professor (since Feb. 2013).

- Experiences:
  Visiting assistant professor - Dept. of E & ECE, IIT Kharagpur (2012 - 2013).
  Postdoctoral Fellow - Ecole Polytechnique de Montreal, Montreal, Canada (2010 - 2012).
  Postdoctoral Fellow - University du Quebec at Montreal, Montreal, Canada (2009 - 2010).
  Research Fellow - Institute for Infocomm Research, Agency for Science, Technology and Research, Singapore (2007 - 2009).

- Academic Qualifications:
  Ph. D. - Indian Institute of Technology, Kharagpur/ RF and Microwave Engineering (2008).
  M. Tech. - Institute of Radiophysics and Electronics, University of Calcutta/ Microwave and millimeter wave technology (2003).
  B. Tech. - Institute of Radiophysics and Electronics, University of Calcutta/ Radiophysics and Electronics (Electronics & Communication Engineering) (2001).

- Current Research Activities:
  Microwave and millimeter-wave circuits:
  - Six port receiver, switching matrix, co-design of active and passive components.
  - Analog beam forming networks: Butler matrix, Nolen matrix, Rotman lens.
  - Passive components: filters, couplers, power divider, phase shifters, time delay networks in printed circuit board technology.
  - Antennas and arrays: leaky wave antennas, UWB antennas, circularly polarized antennas, off-chip antennas.

- Teaching:

  Autumn:

  - EC21003 Introduction to Electronics Theory
  - EC29001 Basic Electronics Lab.
  - EC29003 Introduction to Electronics Lab.

  Spring:

  - EC60324 Millimeter Wave Technology Theory
  - EC69012 Microwave Design Lab.
  - EC29001 Basic Electronics Lab.

- Students:
  M. Tech.:
  Completed:
  Sudini Reshma – Hybrid couplers (2014)
  Pranav Srivastav – Planar filters (2014)

Abhijit Bankar – Phase shifters using signal interference technique (2015)
Nakul Chourasia – Analog beamforming network (2015)
Chanchala Kumari – Array antenna in SIW technology (2015)
Doly Kumari – Ortho-mode transducer (2015)
Diptiranjan Samantaray – Planar leaky wave antennas (2016)
Deljith Davis – Doppler radar for vital signal detection (2016)
Rachuri Anil – Six port receiver (2016)
Srimoyee Roy – Six port receiver (on going)
Ramesh Ilkal – QPSK modulator (on going)
Sanchita Basak – Microwave camera (on going)

PhD:

Arani Ali Khan - Substrate Integrated Waveguide (SIW) components (in progress)
Abinash Singh – Adaptive analog beam forming network (in progress)
Ravi Shaw – Tunable leaky wave antennas (in progress)
Joydev Mandal – Group delay engineering (in progress)
Manisha Kahar - Tightly coupled antennas (in progress)

Professional recognitions, awards, fellowships received:

- Senior member of IEEE (2013).
- Reviewer of *IEEE transaction on Microwave Theory and Techniques (USA), IEEE Microwave Wireless Component Letter (USA), IET Microwave, Antenna and Propagation (UK), Journal OF Electromagnetic Waves and Applications (MIT, USA), and Electronics and Telecommunications Research Journal (Korea)*.
- Marquis who's who 2010, Marquis who's who in engineering 2008.
- Chair/co-chair several conferences: APMC, IMRaC.
- IIT Kharagpur Institute Fellowship, Jan., 2004 to Oct. 2007.
- National scholarship for graduation, Ministry of HRD, Govt. of India, 1998-2001.
- National scholarship for secondary examination, Ministry of HRD, Govt. of India, 1993-1995.

Short term courses coordinated:

- Antenna and Microwave Passive Components – Design and Measurements, (22^{nd} -28^{th} June, 2015), together with Prof. B. K. Sarkar.
- QIP course on “Design of Microwave Filters and Passive Components”, (2^{nd} -7^{th} May 2016).
- “Millimeter Wave Technology” for ISRO scientists and engineers, (27^{th} June – 9^{th} July, 2016).
- TEQIP course on “Substrate Integrated Waveguide Technology”, (13^{th} -15^{th} September, 2016)

Projects:

- Tunable Analog Phase-Shifters for Wireless Transmitters/Receivers, Sponsor - SRIC, IIT Kharagpur (PI).
- Development of Substrate Integrated Waveguide (SIW) Based Passive Devices for Satellite Transponder, Sponsor - ISRO Bangalore Center (PI)
- Retro-directive Array Antennas for Space Applications, Sponsor - ISRO Ahmedabad Center (PI).

Publications:

Total citations: 992 (August, 2016)
h-index: 16
*i*10-index: 19
https://scholar.google.com/citations?user=O1Vraw0AAAAJ

Journals:

1. M. K. Mandal and S. Sanyal, "Compact wideband bandpass filter", *IEEE Microwave and Wireless Comp. Lett*, vol. 16, pp. 46-48, Jan. 2006.
2. M. K. Mandal and S. Sanyal, "A novel defected ground structure for planar circuits", *IEEE Microwave and Wireless Comp. Lett.*, vol. 16, pp.93-95, Feb. 2006.
3. P. Mondal, M. K. Mandal, A. Chakrabarty and S. Sanyal, "Compact bandpass filters with wide controllable fractional bandwidth", *IEEE Microwave and Wireless Comp. Lett*, vol.-16, Issue 10, pp. 540-542, Oct. 2006.
4. M. K. Mandal and S. Sanyal, "Dual mode ring resonator bandpass filter with wide stopband", *Wiley Microwave and Optical Tech. Lett.,* vol. 48, No. 11, pp. 2216-18, Nov. 2006.
5. M. K. Mandal and S. Sanyal, "Design of wide-band, sharp-rejection bandpass filters with parallel-coupled lines",*IEEE Microwave and Wireless Comp. Lett.,* vol. 16, issue 11, pp. 597-599, Nov. 2006.
6. M. K. Mandal, P. Mondal, S. Sanyal and A. Chakrabarty, "Low insertion-loss, sharp-rejection and compact microstrip low-pass filters", *IEEE Microwave and Wireless Comp. Lett.,* vol. 16, issue 11, pp. 600-602, Nov. 2006.
7. M. K. Mandal and S. Sanyal, "Compact bandstop filter using signal interference technique", *IET Electronics Lett.*, pp. 110-111, Jan. 2007.
8. M. K. Mandal, P. Mondal, S. Sanyal and A. Chakrabarty, "An improved design of harmonic suppression for microstrip patch antennas", *Wiley Microwave and Optical Tech. Lett.,* vol. 49, No. 1, pp. 103-105, Jan. 2007.
9. M. K. Mandal, P. Mondal, S. Sanyal and A. Chakrabarty, "Novel compact bandpass filters with wide controllable fractional bandwidth", *Wiley Microwave and Optical Tech. Lett.,* vol. 49, No. 1, pp. 29-31, Jan. 2007.
10. P. Mondal, M. K. Mandal and A. Chakrabarty, "Compact ultra-wideband bandpass filter with improved upper stopband," *IEEE Microwave and Wireless Comp. Lett.,* vol. 17, No. 9, pp. 643-645, Sep. 2007.
11. M. K. Mandal and S. Sanyal, "Compact wide-band bandpass filters using microstrip to slotline broadside-coupling", *IEEE Microwave and Wireless Comp. Lett.,* vol. 17, No. 9, pp. 640-642, Sep. 2007.
12. M. K. Mandal and S. Sanyal, "Reduced-length rat-race couplers", *IEEE trans. on Microwave Theory and Technique*, vol. MTT-55, No. 12, pp. 2593-2598, Dec. 2007.
13. P. Mondal and M. K. Mandal, "Design of dual-band bandpass filters using stub-loaded open-loop resonator", *IEEE trans. on Microwave Theory and Technique,* vol. MTT-56, No. 1, pp. 150-155, Jan. 2008.
14. M. K. Mandal and S. Sanyal, "Compact dual-band rat-race couplers", *Wiley Microwave and Optical Tech. Lett.,* vol. 50, No. 2, pp. 277-281, Feb. 2008.
15. P. Mondal, M. K. Mandal, and A. Chakrabarty, "Compact ultra-wideband bandpass filter with improved out-of-band rejection ", *Wiley Microwave and Optical Tech. Lett.,* vol. 50, No. 3, pp. 758-761, Mar. 2008.
16. M. K. Mandal, V. Vamsi, A. Bhattacharya and S. Sanyal, "Miniaturized quadrature hybrid coupler using high impedance lines", *Wiley Microwave and Optical Tech. Lett.,* vol. 50, No. 5, pp. 1135-1137, May 2008.
17. M. K. Mandal, K. Divyabramham and S. Sanyal, "Design of compact, wide-band bandstop filters with sharp-rejection characteristics", *Wiley Microwave and Optical Tech. Lett.,* vol. 50, No. 5, pp. 1244-1248, May 2008.
18. M. K. Mandal and P. Mondal, "Design of sharp-rejection, compact, wideband bandstop filter", *IET proc. on Microwave, Antennas and Propagat,* vol. 2, No. 4, pp. 389-393, Jun. 2008.
19. M. K. Mandal and S. Sanyal, "Author's reply", *IEEE trans. on Microwave Theory and Technique*, vol. MTT-57, No. 6, Jun. 2008.

20. M. K. Mandal, K. Divyabramham, and S. Sanyal, "Compact, wideband bandstop filters with sharp rejection characteristics" *IEEE Microwave and Wireless Comp. Lett.* vol. 18, No. 10, pp. 665-667, Oct. 2008.
21. K. Divyabramham, M. K. Mandal, and S. Sanyal, "Sharp-rejection wideband bandstop filters", *IEEE Microwave and Wireless Comp. Lett.* vol. 18, No. 10, pp. 662-664, Oct. 2008.
22. V. K. Velidi, M. K. Mandal and A. Bhatyacharya, "Uniplanar harmonic suppressed compact rat-race couplers",*Wiley Microwave and Optical Tech. Lett.* vol. 50, No. 11, pp. 2812-2814, Nov. 2008.
23. M. K. Mandal, V. K. Velidi, S. Sanyal and A. Bhatyacharya, "Design of ultra-wideband bandstop filter with three transmission zeros", *Wiley Microwave and Optical Tech. Lett.* vol. 50, No. 11, pp. 2955-2957, Nov. 2008.
24. V. K. Velidi, M. K. Mandal and S. Sanyal, "Microstrip coupled-line lowpass filter with wide stopband for RF/wireless systems", *ETRI Journal*, vol. 31, No. 3, pp. 324-326, Jun. 2009.
25. M. K. Mandal, P. Mondal and S. Sanyal, "Low insertion loss, wideband bandpass filters with sharp rejection characteristics", *IET proc. on Microwave, Antennas and Propagat.* vol. 4, No. 4, pp. 99-105, Jan. 2010.
26. M. K. Mandal and Z. H. Chen, "Coplanar stripline ultra-wideband compact uniplanar bandpass filter with a notched band", *Wiley Microwave and Optical Tech. Lett.* vol. 52, No. 5, pp. 1201-1203, May. 2010.
27. M. K. Mandal and Z. H. Chen, "A compact wideband coplanar stripline bandpass filter with wide upper stopband and its application to antennas", *IET proc. on Microwave, Antennas and Propagat.* vol. 4, Issue 12, pp. 2166-2171, Dec. 2010.
28. M. K. Mandal and Z. H. Chen, "Compact dual-band and ultra-wideband loop antennas", *IEEE trans. on Antennas and Propagation,* vol. 59, No. 8, pp. 2774-2779, Aug. 2011.
29. M. K. Mandal, K. Divyabramham, and V. K. Velidi, "Compact bandstop filter with five transmission zeros", *IEEE Microwave and Wireless Comp. Lett.*. vol. 22, No. 1, pp. 4-6, Jan. 2012.
30. M. K. Mandal, D. Deslandes, and K. Wu, "A complementary microstrp-slot line stub configuration for group delay engineering," *IEEE Microwave and Wireless Comp. Lett.* vol. 22, No. 8, pp. 388-390, Aug. 2012.
31. P.S. Bakariya, S. Dwari, M. Sarkar and M.K. Mandal, "Proximity coupled microstrip antenna for Bluetooth, WiMAX and WLAN applications", *IEEE Antennas and Propagation Lett*., vol. 14, pp. 755 - 758, 2015.
32. P.S. Bakariya, S. Dwari, M. Sarkar and M.K. Mandal, "Proximity coupled multiband microstrip antenna for wireless applications ", *IEEE Antennas and Propagation Lett*., vol. 14, pp. 646 - 649, 2015.
33. S. Reshma and M.K. Mandal, Miniaturization of a 90^0 hybrid coupler with improved bandwidth performance, *IEEE Microwave and Wireless Comp. Lett.*, (accepted).
34. A. A. Khan and M.K. Mandal, Miniaturized substrate integrated waveguide (SIW) power dividers, *IEEE Microwave and Wireless Comp. Lett.*, (accepted).
35. A. A. Khan and M.K. Mandal, A compact broadband direct coaxial line to SIW transition, *IEEE Microwave and Wireless Comp. Lett.*, (accepted).

Conference Proceedings:

36. M. K. Mandal and A. Maitra, "Rain attenuation prediction by using an artificial neural networks", *Horizon of Technology Conference -2003*, Kolkata, India, July, 2003.
37. M. K. Mandal and S. Sanyal, "A novel feeding technique for dual frequency operation of a microstrip antenna",*Asia-Pacific Microwave Conference-2004*, New Delhi, India, Dec., 2004, pp.-901-902.
38. S. Sanyal, M. Ali, M. K. Mandal, S. Dwari, "Radiation from arbitrary cross section open ended w/g", *International Conference On Antenna Technologies, SAC (ISRO*), Ahmedabad, India, Feb., 2005, pp.-901-902.
39. M. K. Mandal and S. Sanyal, "An improved lowpass filter using microstrip defected ground structure", *XXVIIIth General Assembly of International Union Radio Science*, New Delhi, India, Oct., 2005, pp.-06.

40. M. K. Mandal and S. Sanyal, "Study on the effect of different shapes of defected ground structures using Finite-Difference Time-Domain technique", *International Conference on Computational Fluid Dynamics and Electromagnetics-06*, Bisakhapatnam, India, July, 2006, pp.-409-415.

41. M. K. Mandal and S. Sanyal, "U-shaped microstrip structure to decrease DGS resonance frequency", *36th European Microwave Conference-2006,* Manchester, UK, Sept., 2006, pp. 283-286.

42. M. K. Mandal and S. Sanyal, "Study on the effect of metallic enclosure on the performance of defected ground structures using Finite-Difference Time-Domain technique", *National Conference on Microwave - 2006*, Jaipur, India, Oct. 2006, pp. 472-476.

43. M. K. Mandal and S. Sanyal, "Compact, low insertion-loss, sharp-rejection wide-band bandpass filters using signal interference technique", *National Conference on Microwave - 2006*, Jaipur, India, 6-8th Oct'2006, pp. 481-485.

44. M. K. Mandal and S. Sanyal, "Design of sharp-rejection wide-band bandpass filters", *Asia-Pacific Microwave Conference - 2006*, Yokohama, Japan, Dec., 2006.

45. S. Sanyal and M. K. Mandal, "High-performance compact, wide-band bandpass filters for microwave circuit applications", *National Conference on Antennas and Propagation-06,* Kochi, India, Dec., 2006, pp. 265-268.

46. M. K. Mandal and S. Sanyal, "An improved design approach of harmonic suppression for microstrip patch antennas", *IEE conference on Computers and Devices for Communication-06*, Kolkata, India, Dec. 2006, pp. 33-35.

47. M. K. Mandal and S. Sanyal, "A novel technique for designing sharp-rejection, compact, wide-band bandpass filters with parallel-coupled lines", *IEE conference on Computers and Devices For Communication-06*, Kolkata, India, Dec. 2006, pp. 403-406.

48. V. K. Velidi, M. K. Mandal, A. Bhattacharya and S. Sanyal, "Realization of reduced size planar 90^0 branch-line coupler using parallel lines for RF/Microwave applications", *Conference on Advances in Space Science and Technology (CASST 2008),* Kharagpur, India, 14-16 Jan. 2008, ID 64.

49. V. K. Velidi, M. K. Mandal, A. Bhattacharya and S. Sanyal, "Compact microstrip dual-band quadrature hybrid coupler for mobile bands", *National Conference on Communications,* IIT Bombay, India, Feb. 2008, pp. 27-31.

50. P. Mondal, G. Y. Liang, M. K. Mandal, and A. Alphones, "Uniplanar ultra-wideband pulse generators", in *39th European Conference*, Rome, Italy, 2009, pp. 335-338.

51. M. K. Mandal, Z. H. Chen, and X. Qing, "Compact ultra-wideband filtering antennas on low temperature co-fired ceramic substrate", *Asia-Pacific Microwave Conference 2009*, Singapore, Dec. 2009.

52. M. K. Mandal, K. Wu and D. Deslandes, "A compact planar orthomode transducer", in *IEEE International Microw. Symposium - 2011*, Baltimore.

53. M. K. Mandal, Z. H. Chen, "Compact ultra-wideband microstrip-to-coplanar stripline transitions", in *IEEE MTT-S Microwave and RF Conference,* 2013*,* New Delhi.

54. A. A. Khan, M. K. Mandal and S. Sanyal, "Unloaded quality factor of a substrate integrated waveguide resonator and its variation with the substrate parameters", *2013 International Conference on Microwave and Photonics (ICMAP)*, Dec. 2013.

55. R. Shaw, A. A. Khan, M. K. Mandal, Dual-beam substrate integrated waveguide periodic leaky-wave antenna, *2015 International Conference on Microwave and Photonics (ICMAP),* Dec. 2015.

56. A. A. Khan, R. Shaw, M. K. Mandal, Dual-mode bandpass filter using via less substrate integrated waveguide technology, *2015 International Conference on Microwave and Photonics (ICMAP)* Dec. 2015.

57. A. K. Singh, J. Mandal, M. K. Mandal, Design of a compact and wideband branchline coupler using hybrid approach, *2015 International Conference on Microwave and Photonics (ICMAP),* Dec. 2015.

58. A. A. Khan, M. K. Mandal, R. Shaw, A compact and wideband SMA connector to empty substrate integrated waveguide (ESIW) transition, *IEEE MTT-S International Microwave and RF Conference (IMaRC)*, Dec. 2015.

59. M. Kahar, J. Mandal, M. K. Mandal, A compact vivaldi antenna with microstrip feed line for the 2-18GHz ultra-wideband applications, *AEMC*, Dec. 2015.
60. R. Shaw, A. A. Khan, D. Samantaray, M. K. Mandal, A comparative study on substrate integrated waveguide periodic leaky wave antennas with differently shaped periodic slots, *AEMC*, Dec. 2016.
61. R. Shaw and M. K. Mandal, SIW periodic leaky wave antenna with improved H-plane radiation pattern using baffles, *Indian Antenna Week*, Jun. 2016.

- **Researcher Id -** http://www.researcherid.com/rid/F-3687-2010

Workshop presentation and invited talks:

- Microwave passive components – ISAC, ISRO, Bangalore (2013)
- Microwave transceivers – Haldia Institute of Technology (2015)
- Substrate integrated circuits – NIT Durgapur (2015)
- Workshop on Filter – IMaRC, Hyderabad (2015)
- Microwave passive components for wireless applications – NIT Patna (2016)
- Planar guides and passive components: design challenges – SAC, ISRO, Ahmedabad, (2016)
- Printed line at terahertz frequencies – NIT Patna (2016)
- Millimeter wave antennas – GSST, IIT Kharagpur (2016)