

# **IET Colloquium on Radio Propagation and Technologies for 5G 2016**

IET Seminar Digests 2016/0005

Durham, United Kingdom  
3 October 2016

ISBN: 978-1-5108-3483-5

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2016) by the Institution of Engineering and Technology  
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact the Institution of Engineering and Technology  
at the address below.

Institution of Engineering and Technology  
P. O. Box 96  
Stevenage, Hertfordshire  
U.K. SG1 2SD

Phone: 01-441-438-767-328-328  
Fax: 01-441-438-767-328-375

[www.theiet.org](http://www.theiet.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>AN OVERVIEW OF MASSIVE MIMO RESEARCH AT THE UNIVERSITY OF BRISTOL</b> .....	1
<i>P. Harris, W. B. Hasan, H. Brice, B. Chitambira, M. Beach, E. Mellios, A. Nix, S. Armour, A. Doufexi</i>	
<b>SPARSE HYBRID PRECODING AND COMBINING IN MILLIMETER WAVE MIMO SYSTEMS</b> .....	6
<i>A. Kaushik, J. Thompson, M. Yaghoobi</i>	
<b>THREE-DIMENSIONAL MILLIMETRE WAVE BEAM TRACKING BASED ON HANDSET MEMS SENSORS WITH EXTENDED KALMAN FILTERING</b> .....	13
<i>Zichen Qi and Wei Liu</i>	
<b>TESTING 5G: EVOLUTION OR REVOLUTION?</b> .....	19
<i>M. Rumney, P. Cain, T. Barratt, A. L. Freire, Wenfang Yuan, E. Mellios, M. Beach</i>	
<b>INDOOR RADIO PROPAGATION MEASUREMENTS IN THE V-BAND</b> .....	28
<i>X. Raimundo, S. Salous, A. A. Cheema</i>	
<b>Author Index</b>	