Prof. Akbar Sayeed's Response to the Investigation Report Dated May 31, 2017, and Provost Mangelsdorf's Letter Dated Aug 3, 2017

Prof. Sayeed takes full responsibility for the unprofessional and negative aspects of his behavior and how they have impacted his students and colleagues. He is sincerely sorry for all the pain and suffering his behavior has caused his students, colleagues and others. At the same time, he reiterates what he has not done and refutes any charges related to "abuse of authority". He also takes this opportunity to address some aspects of the investigation that he finds wanting. Furthermore, Prof. Sayeed shares some observations on how his department and college have handled this matter, and some related observations and thoughts on the issues of bias and climate in the Electrical Computer Engineering (ECE) department, the College of Engineering and the UW-Madison. Finally, he shares some reflections on his cultural background and upbringing, their potential relationship to his behavior, and, most importantly, what steps and actions Prof. Sayeed has been taking in the last several years, and will continue to take for the foreseeable future, to address the negative aspects of his behavior going forward.

The Findings of the Investigation with Regard to Charges Against Prof. Sayeed:

Provost Mangelsdorf had asked Professor (Emerita) Wolleat to investigate Prof. Sayeed's conduct in relation to five charges (1A/B, 2, 3, 4) as also noted in the Provost's letter to Prof. Sayeed dated August 3, 2017. The five charges directed towards Prof. Sayeed's conduct are:

1. *The concern that:*
A. *You engaged in behavior that could be described as, "unwelcome" behavior pervasive or severe enough that a reasonable person would find it hostile and/or intimidating and that does not further the university's academic or operational interests" (II-332, part I).*
B. *Your behavior "is unacceptable to the extent that it makes conditions for work inhospitable and impairs another person's ability to carry out his/her responsibilities to the university" (II-332, part I).*
2. *The concern that:*
Your behavior evidences an "abuse of authority, such as using threats or retaliation in the exercise of authority, supervision, or guidance..." (II-332, part I).
3. *The concern that:*
Your behavior has included "abusive expression... directed at another person in the workplace, such as derogatory remarks or epithets that are outside the range of commonly accepted forms of disagreement, disapproval, or critique in academic culture and professional settings that respects free expression" (II-332, part I).
4. *The concern that:*
You have engaged in "conduct which adversely affects (your) performance of (your) responsibilities to the university but which is not serious enough to warrant dismissal" (FPP, chapter 9.02).

Prof. Wolleat found Prof. Sayeed in violation of all five charges. As Prof. Sayeed had indicated in his face-to-face meetings with the Provost and Prof. Wolleat (in February and March 2017,

respectively), he generally accepts the findings of the investigation on four of the five charges above (1A, 1B, 3 and 4). However, as he also noted in his meetings with the Provost and Prof. Wolleat, and elaborated below in response to the report, **Prof. Sayeed respectfully disagrees with and challenges the findings on Charge 2 involving "abuse of authority".** Specifically, the report cites the following reasons for the finding on Charge 2 (see page 19 of the report):

1. *Most students were required to work many more hours than their contracts specified.*
2. *Some students were threatened that their contracts would be pulled if they complained about excessive work hours.*
3. *Students were told that they should have the lab as their priority and to relegate academics and personal relations to a lesser status.*
4. *Prof. Sayeed threatened students with ambiguous physical threats.*

Regarding reason 1, it is should be noted that it is a common, unwritten and implied expectation – certainly in Prof. Sayeed's department and similar research departments nationwide – that graduate students work far more than the hours specified in their contracts. Anyone claiming otherwise is simply not telling the truth. For example, the usual 50% percent appointment stipulates 20 hours of work per week. However, most if not all graduate students work significantly more hours than that. The same is true of faculty, most of whom work more than the 40 hours/week that their contract stipulates (as also reported in a survey done recently at the UW-Madison). There is more sensitivity to this issue now and that is perhaps a good development but to cite this expectation on part of Professor Sayeed as an abuse of authority is reaching.

Prof. Sayeed refutes Reason 2. Prof. Sayeed makes it clear to the students joining his research group that he works hard and he expects them to work hard and if that was an issue then the students would likely be better off joining a different group. However, he does not force them to work hard by threatening to pull their contracts. In very rare cases, Prof. Sayeed has cancelled a student's appointment when it is clear that there is not a good match between the ongoing research in Sayeed's group and the student's research interests and technical background – but never because a student in not putting enough hours. In some cases, in the heat of the moment, Prof. Sayeed may have said something that may be construed as a threat of cancelling the contract, but he has never acted on it simply because he felt that the student did not work enough hours.

Reason 3 is related to Reason 2 and it is more of a reflection of Prof. Sayeed's philosophy of priorities rather than evidence of abuse of authority. First of all, while it may be true in other fields that academic work and lab work are distinct, in Engineering and certainly in Prof. Sayeed's research field, academics (course work) and lab work are very closely related in that the tools and techniques learned in classes are directly applied in the research work in the lab. Conversely, and equally importantly, the lab research work provides a very concrete and meaningful context

for what the students are learning in the classes and actually facilitates the learning. In fact, lab work is a great opportunity for students to sharpen and hone their technical skills as they apply to real-world problems. This has been particularly true in Prof. Sayeed's lab since 2010 when the lab started designing and building a complete prototype hardware for the new technology that they had invented. Secondly, from the practical and important viewpoint of finding a good job, the actual experience in the lab – especially the kind of experience that the students have been receiving in the prototype design and development in Prof. Sayeed's lab – is a more significant factor than the courses the students have taken. Finally, with regard to personal relationships, Prof. Sayeed refutes that he expects his students to relegate their personal relationships to the lab. However, he does emphasize that the commitment to work in the lab and related deadlines is also very important – both in graduate school and in their future jobs – and needs to be appropriately balanced with personal commitments.

Prof. Sayeed refutes Reason 4 as well. He notes that he has never physically hurt any student in his 20+ years at Wisconsin! He does admit that some of his actions or poor choice of words in recent years may have been perceived by students as an ambiguous physical threats. However, it was never his intention and he has never acted as such either. The evidence provided seems more related to abusive expression rather than abuse of authority, which is amply covered by the other charges.

The most significant evidence of Prof. Sayeed not abusing his authority lies in the students' responses to various items in Question 4 of the questionnaire used by Assistant Dean Jason Jankoski in his investigation (reported on page 44 and 45 of the report – the handwritten page numbers at the bottom). All students unanimously responded "no" to the following questions:

Has Professor Sayeed ever:

- *Threatened to remove your funding or to remove you from the graduate program (all "no")*
- *Threatened to prevent you from changing advisors or schools (all "no")*
- *Threatened to provide negative references (all "no")*
- *Threatened to "destroy your career" if you decide to leave the lab or make a career change? (all "no")*

The students also unanimously answered "no" to Question 6 (page 45 of the report): *Has Professor Sayeed ever asked you to do something that you feel uncomfortable (all "no").*

It should also be noted that Prof. Sayeed is on good terms with all of his former students.

In summary, given Prof. Sayeed's history with students and colleagues over the last 20+ years at UW-Madison, and the information collected by Prof. Wolleat and Assistant Dean Jason Jankoski

for the report, the conclusion reached on Charge 2 of "abuse of authority" seems forced, reaching and potentially biased. Thus, Prof. Sayeed also respectfully disagrees with and refutes the following statement in Provost Mangelsdorf's letter (page 3, item 5): *"It appears that there is clear and convincing evidence that you misused your power and authority as a professor and engaged in unprofessional conduct".* Prof. Sayeed admits that he engaged in unprofessional conduct, but refutes the assertion that he misused his power and authority as a professor.

Prof. Sayeed is also disappointed that Provost Mangelsdorf did not care to acknowledge that he has been in counseling since 2013 (even though he shared this information in his face-to-face meetings with her, Prof. Wolleat, and Dean Robertson) when she recommended in her letter (page 3): "I recommend that you seek personal counseling to address your behavior".

Information Used in the Investigation: The investigation was prompted by a complaint filed by the father of Prof. Sayeed's former student [redacted] after his [redacted] death on [redacted] As evident from the report, the investigation was strongly influenced by the information provided by [redacted] father as part of the complaint, which included:

- A page and half document written by [redacted] in October 2015 outlining his thoughts on the problems in Prof. Sayeed's lab.
- Copies of various emails and text messages between [redacted] and other people.
- Audio recordings of several meetings involving Prof. Sayeed, made by [redacted] without knowledge or consent of Professor Sayeed.

As documented in the report, additional information was gathered by Assistant Dean Jason Jankoski as part of his investigation that involved at least 13 current and former graduate students who were associated with Prof. Sayeed's lab at one point or another. Transcripts of the questionnaire used by Jankoski and the students' responses were included in the report.

Additional information was gathered by Prof. Wolleat as part of her investigation, including interviews with faculty, administrators and students. As noted in the report, the faculty and administrators in the College of Engineering interviewed for the report included: Associate [redacted] Dean [redacted], Associate Dean [redacted] Professor [redacted] ECE Professor [redacted] and ECE Professor [redacted]. Only transcript of the interview with Prof. [redacted] was included in the report. No documentation of the inverviews with [redacted] or [redacted] is included in the report.

Prof. Sayeed met with Provost Mangelsdorf and Senior Legal Counsel Brian Vaughan on February 27, 2017. Prof. Sayeed asked if he make an audio recording of the meeting. The Provost and the Legal Counsel did not want the meeting recorded so Prof. Sayeed did not.

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Prof. Sayeed met with Prof. Wolleat for a nearly 2 hour interview on March 10, 2017. Prof. Wolleat did consent to an audio recording of the meeting and Prof. Sayeed made a recording.

Prof. Sayeed's Relationship with [redacted] The investigation was strongly influenced by the information provided by [redacted] father. However, that information does not reflect the full breadth or depth of the relationship between Prof. Sayeed and [redacted]

First, Prof. Sayeed had the highest regard for [redacted] intellectual and technical capabilities. He did everything to advance [redacted] academic career as evident from: the papers he co-authored with [redacted] the number of conferences [redacted] traveled to for presenting the work, including international trips to Montreal, Toronto, Vancouver, and London; and Prof. Sayeed's nomination of [redacted] for several fellowship opportunities during the course of his graduate studies. Finally, after [redacted] death, Prof. Sayeed was the first to bring up the idea of nominating [redacted] and his critical and thorough evaluation of [redacted] research contributions was essential to the [redacted] being approved and awarded to [redacted] **(see Exhibit A).** It should be noted that this is one of the very rare cases (a handful in UW-Madison's history) in which a [redacted] has been awarded by the UW-Madison.

Second, Prof. Sayeed and his family had opened their home to [redacted] In fact, he had visited Prof. Sayeed's home on several occasions between 2012 and 2017, including in early August 2016, a couple of months before his [redacted] death on [redacted]

Third, the implications in [redacted] father's comments that somehow [redacted] was responsible for training the new graduate students in the lab by himself, and that Prof. Sayeed was intentionally delaying [redacted] completion of his Ph.D. degree, are not founded in fact. Prof. Sayeed greatly valued [redacted] input given his background, skills and the fact that he had been in involved in the prototype development project right from the beginning in 2010. However, to claim that [redacted] was responsible for training the students by himself is not warranted. This observation is borne by the fact that Prof. Sayeed has been able to successfully train a completely new group of students since Fall 2016. In fact, the group did a successful demonstration of an advanced version of the prototype in July 2017. Furthermore, Prof. Sayeed was well aware that [redacted] had already made more than sufficient contributions for a PhD degree and all he needed was to go through the remaining steps: form a committee, present a thesis proposal, write a thesis and defend it. In fact, Prof. Sayeed and [redacted] had extensive discussions on this issue in late summer and Fall of 2016 and had created a plan and tentative timeline for [redacted] obtaining his PhD degree by the end of Spring or Summer of 2017 **(Exhibit B).**

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Prof. [redacted] Prof. Sayeed's collaboration with Prof. [redacted] which started in 2009 deteriorated over time for a number of reasons (Prof. Sayeed and Prof. [redacted] have shared their points of view independently with ECE Chair Prof. Booske). A few points are worth noting here. First, Prof. Sayeed and Prof. [redacted] mutually stopped any collaboration in December 2013. However, Prof. [redacted] did not bring forth his complaints with the ECE Chair, John Booske, until summer (June/July) 2016. Second, Prof. Sayeed had actively helped Prof. [redacted] in obtaining his first extramural NSF grant at the UW in 2009 (Prof. [redacted] was having some difficulty initially securing grants). This grant was the basis of a subsequent bigger NSF grant and a WARF-funded prototype development project (as part of the WARF accelerator program) for which [redacted] was recruited. The project was Prof. Sayeed's brainchild and he was the principal investigator on all these grants. Third, Prof. Sayeed did everything that his department chair Prof. Booske asked him to do for potential reconciliation with Prof. [redacted] The goal of this effort was to eventually have a facilitated meeting between Prof. Sayeed and Prof. [redacted] to start the process of reconciliation. Unfortunately, while Prof. Sayeed has been willing to have a mediated joint meeting with Prof. [redacted], it has not happened to date because Prof. [redacted] feels he not ready for it **(Exhibit C).**

Investigation by Assistant Dean Jason Jankoski: One of the recommendations of Assistant Dean Jankoski, based on his investigation, was for an investigation by the Provost "specifically for abuse of authority and influence." (See page 46 of the report and also **Exhibit D – D1)**. As elaborated above, Prof. Sayeed refutes this charge. Furthermore, it is worth noting and a bit odd that Mr. Jankoski arrived at this conclusions without ever interviewing Prof. Sayeed as part of his investigation, even though Prof. Sayeed explicitly asked Dean Robertson in one of their face-to-face meetings whether Mr. Jankoski was going to interview him or not (and hoping that such an interview would occur, which never happened).

Departmental Guidance and Support: Prof. Sayeed feels that had the ECE Department taken some action in response to student's complaints, it may have altered some of the outcomes. For example, one student who was interviewed noted that he brought his concerns about Prof. Sayeed's behavior to Prof. Vernon in the ECE department, and Chair, Prof. Booske. However, according to the student (**see exhibit D – D2**), Prof. Vernon told him that "he was been too sensitive" and Prof. Booske told him that "they wanted to keep this under the rug". Similarly, Prof. Nowak was aware of these problems as early as October 2015 when [redacted] contacted him, but did not make any effort to speak with Prof. Sayeed directly (**see exhibit D – D3**). This was a major oversight on part of the department and perhaps some of the outcomes could have been different had someone talked with Prof. Sayeed earlier.

It is worth noting that Prof. Sayeed has known Prof. Booske and Prof. Nowak since his undergraduate days at UW-Madison (1989-1991). Prof. Booske was an assistant professor in the

ECE department at that time, and Prof. Sayeed took at least one course from him, and also did independent research study with him. Prof. Nowak was a fellow undergraduate student at UW-Madison at that time, one year senior to Prof. Sayeed. Prof. Sayeed got to know Prof. Nowak even more during graduate school and afterwards as they were part of the same research community in the field of "signal processing." Prof. Sayeed feels disappointed that neither of them, especially Prof. Booske being the chair, tried to talk with Prof. Sayeed about these problems, let alone offer help or advice. It is also worth noting that when Prof. Booske brought Prof. [redacted] complaints to the Prof. Sayeed's attention (summer 2016), despite the fact that Prof. Sayeed was quite surprised and upset by the nature and timing of the complaints, [redacted]

Observations Related to Climate and Bias at UW-Madison: Prof. Sayeed would like to share some observations, related to climate and bias at the UW-Madison, in this report. The issues raised by these observations and their impact on Prof. Sayeed may be relevant to his anger-related behavioral issues at the heart of this investigation. The bias against under-represented non-white faculty, students, and staff at UW-Madison has been noted in a number of recent surveys. Dean Robertson also noted these surveys with a recommendation for anti-bias training in his recent presentation to the faculty on Sep. 13, 2017. Prof. Sayeed has experienced it first hand, unfortunately many times, over the course of his 20+years at UW-Madison. Some examples:

- Ethnically/racially insensitive statements made (quite a few times) by his faculty mentors when Prof. Sayeed was an assistant professor (1997-2003). **Example 1: being called a "towel head" by Prof. [redacted] (now retired). Example 2: being told "you can take a third worlder out of the third world, but you cannot take the third world out of the third worlder" by Prof. [redacted], currently a [redacted] Professor in ECE.**
- More recently (in the last year), being asked by the [redacted] who has known him since 1989: **"Do you celebrate Christmas?"**
- Prof. Sayeed's name is misspelled as **Prof. Chin Sayeed** in the questionnaire used by Assistant Dean Jankoski in the investigation for collecting input from former students – see page 43 of the report (**see also Exhibit D – D4**).
- A printout of an email that Prof. Sayeed accidentally discovered in a department-wide printer in 2001. The email was sent by Prof. [redacted] to Prof. [redacted], Prof. [redacted], Prof. [redacted] and a graduate student of Prof. [redacted] at the time [redacted] The subject line of the email was "John 2"and it was apparently related to a Bible Study that the group was involved in, led by Prof. [redacted] Prof. Sayeed remembers feeling uncomfortable finding this printout in the departmental printer, including the feeling of "not belonging" or feeling like "an outsider". Prof. Sayeed also

wondered if this was even appropriate in view of "separation of church and state". It is also worth noting that Prof. Sayeed was collaborating with [redacted] and [redacted] on a research project at that time, and [redacted] was also one of his faculty mentors (**see Exhibit E**).

These are a few of the more blatant examples. There are countless other so-called "micro aggressions" that Prof. Sayeed has endured and continues to endure on a regular basis that take a toll over time.

It is also worth noting that when Prof. Sayeed shared the initial decision of the Provost with an Ombudsman and his counselor, they were both very surprised by the nature and severity of the disciplinary action. In the end, Prof. Sayeed cannot help wondering that if his name was John Smith, would things have turned out differently?

A Brief Overview of Prof. Sayeed's Career at UW-Madison: While the focus of the report was an investigation of misconduct by Prof. Sayeed, let us not forget that he has been at UW-Madison for over 20 years and has actually done a few positive things during that time as well! He was an undergraduate transfer student at UW-Madison (1989-91) when he first moved to the United States in 1989, went to University of Illinois for graduate school (1991-1996), and spent a year at Rice University (1996-1997) as a postdoctoral fellow before returning to the UW-Madison in 1997 as an Assistant Professor in Electrical and Computer Engineering. He was promoted to Associate Professor with tenure in 2003, and then to Full Professor in 2008.

Prof. Sayeed founded the Wireless Communication and Sensing Laboratory (http://dune.ece.wisc.edu) in 1997 that has been at the forefront of research and technology development in the broad field of wireless communication and sensing. To date, Prof. Sayeed has graduated 11 PhD students and 14 MS students. All of them found employment of choice right after graduation, and all have been successful in their careers by any measure.

He has established a successful and well-funded research program that has brought nearly $6M in external funding to the UW-Madison to date, with an overhead of around $2M.

Prof. Sayeed has brought visibility and prestige to the ECE Department, College and UW-Madison through his research contributions and visibility in the research community. He was elected a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), the leading professional society in his field, in 2012 in recognition of his research contributions **(see Exhibit F for a full CV).**

Reflections on Prof. Sayeed's Background and Personal Plans: Prof. Sayeed takes full responsibility for his behavior and feels sincere remorse for its negative impact on his students and colleagues. Here Prof. Sayeed shares some personal reflections on his background and upbringing that have shaped parts of his behavior. He also wants to highlight his recent and ongoing efforts at addressing his behavioral issues at the heart of this investigation.

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Prof. Sayeed believes that the abusive aspects of his behavior identified in this report are tied to anger-related issues that he has been dealing with all his life. However, he did not explicitly recognize these aspects of his behavior and their negative consequences until he started his job at the UW in 1997. (It was a telephone conversation with his aunt about his dad that prompted this realization. His dad had anger issues as well. Prof. Sayeed endured physical and emotional abuse as a child). He is not proud of it, but his relationships with virtually all of his students have been negatively impacted by his behavior at some point during their graduate studies. At the same time, he knows that he has never intentionally tried to hurt any of his students or jeopardize their academic or professional development or careers. In fact, he is proud to say that he is on good terms with all of his former students.

As a researcher and colleague, Prof. Sayeed is not the stereotypical faculty member. He can be very candid – to the point of being very direct or blunt at times – that is not always comfortable for others. Sayeed feels that he is very thick skinned and (unreasonably) expects others to be so as well.

Sayeed also does not take himself too seriously and expects others not to take themselves too seriously either. This has backfired with some professional colleagues who find his candid feedback almost offensive or disrespectful. It has also backfired with some students, and possibly junior faculty, who take him more seriously than he realizes!

There are three main negative aspects of Sayeed's behavior: i) raising his voice/yelling, ii) cursing or using foul language, and iii) making disparaging or belittling remarks towards others (e.g. students and colleagues). He is not proud to admit that it has taken him an awfully long time to realize that not everyone can brush them off as easily as he can. (This is related to the kind of environment he encountered growing up in Pakistan; similar to the middle east and even parts of southern Europe, where emotional expression can be quite vivid and dramatic.)

Sayeed thinks that the events in his life in the last 10 years are particularly significant to the current situation. In 2006 his personal life was at a relative low point, and his motivation at work was at a record low. He was not sure if he would ever regain his joy for life or work. Then slowly, he started taking care of himself and then came one of the most significant years of his life - 2008: He became a citizen of the United States on his birthday on [redacted] he met his future wife [redacted] on October 24 after going to his first badger football game; he voted for the first time in the historic presidential election, and watched the results on television with [redacted] the night Barack Obama was elected president. He got married on [redacted] s father passed away (at the age of 55) on [redacted] after his second battle with cancer. Their son [redacted] was born in [redacted] and in June 2012 Sayeed quit smoking in preparation for [redacted] arrival (after being a heavy smoker for 10 years!). On [redacted] Sayeed's father passed away at the age of 84. Luckily he was able to say goodbye to him in June 2013.

Sayeed and [redacted] did not have much family support to help with [redacted] arrival. At the same time, Sayeed was doing something new for the first time in his work: his research group was actually building a state-of-the-art prototype system in an emerging technology that was ripe for disrupting the wireless landscape! In effect, he was running his lab like a small start-up.

So while he was having the greatest time of his life, the stressors in his life were also at an all-time high. The result was that his negative behavioral issues were getting more pronounced at both work and home. So, on the urging and encouragement of his wife, he sought counseling in June 2013 – just before he traveled to Pakistan to visit his family, particularly his dying father. In retrospect, this was the best thing he did for himself. He has been seeing a counselor regularly – roughly every 4-6 weeks – to this day, and it has been extremely helpful.

Just around the time of [redacted] death, Sayeed's first counselor was retiring. So, he got assigned a new counselor and then that counselor took a new job, so now he is onto his third counselor, who is really good and Sayeed is seeing continual (although slow) improvement. As his first counselor noted, "you have developed this behavior over the course of 40+ years and you are not going to change it overnight!" So, Sayeed is trying his best to be patient with himself and everyone around him.

Some of the other things that Sayeed has been doing to improve his behavior with the ultimate goal of eliminating the three main negative aspects, include:

- Meditating on a regular basis.
- Exercising on a regular basis.
- Getting sufficient sleep on a regular basis.
- Medication since 2015.
- Keeping track of the times when he engages in negative behavior, and applying "cognitive behavioral therapy" and "role playing" techniques that he has learned in counseling to break the cycle.
- Being thankful every day for all the great things in his life: his family, his health, his family's health, his job, his friends, his colleagues, his students, UW, Madison, the Badgers, and the Green Bay Packers.
- Creating a better work-life balance by creating a bigger circle of friends outside of work. His 4-year old son is greatly facilitating that!
- Honoring his commitment to improving his behavior in memory of [redacted]

His second counselor noted: "Our behavior is shaped by all sorts of influences in childhood and growing up. However there is one aspect of adult life that can have an equally potent impact on our behavior: a traumatic event. We can use such as event as an 'anchor' to make a positive change in our lives and behavior". To Sayeed, [redacted] death was one such traumatic event. [redacted] is his anchor going forward.

Prof. Sayeed fully realizes that the negative aspects of his behavior are unacceptable and need to be modified for effective positive change. They affect everyone: his wife, his 4-year old son, his students, his colleagues, and himself. He is sincerely sorry for all the pain and suffering his behavior has caused to others around him. He turned 50 this year and he is committed to make a positive change in earnest! He is committed to prove to himself, his family, and his students and colleagues at the UW and beyond that he can do it. He feels that he is finally getting to the place where he can fully contribute and give back to Madison and the UW, his first home when he came to the US as a transfer student in January 1989.

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List of Exhibits

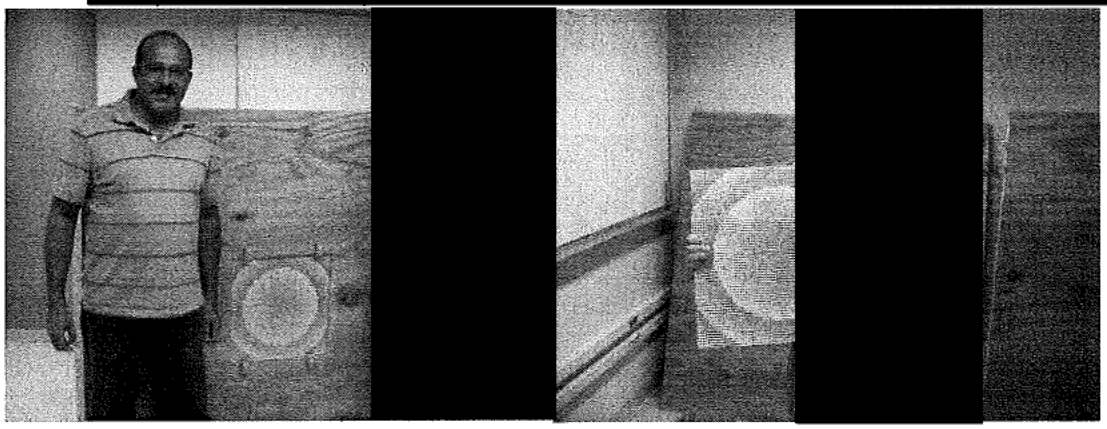
A. [redacted] for [redacted] led by Prof. Sayeed. It was one of the very rare cases (a handful in UW-Madison's history) in which a [redacted] has been awarded by the UW-Madison. (8 pages including cover page)
B. Some information on [redacted] relationship with Prof. Sayeed and his family. (4 pages)
C. Email from Sherry Boeger of the Employee Assistance Office (EAO) informing Prof. Sayeed that Prof. [redacted] is not ready for a facilitated meeting. (2 pages)
D. Material from the Investigation Report referenced in this response (3 pages):
    1. Recommendations by Assistant Dean Jankoski based on his investigation
    2. Prof. Vernon's and Prof. Booske's (partial) knowledge of the situation through a student
    3. Prof. Nowak's knowledge of the situation through an email from [redacted]
    4. Prof. Sayeed's name misspelled as "Chin Sayeed" in the questionnaire used by Assistant Dean Jankoski
E. Scan of a printout of an email that Prof. Sayeed found in one of the departmental printers in 2001 when Prof. Sayeed was an Assistant Professor. (3 pages)
F. Prof. Sayeed's CV. (30 pages)

Exhibit B

A Timeline of [redacted] visits to Sayeed's Home, Some Photographs, and Some Additional Thoughts on Sayeed's Relationship with [redacted]

[redacted] visited Prof. Sayeed's home a number of times between 2012 and 2017:

- 2011: Sayeed's wife took some pictures of Sayeed and [redacted] with their first prototype (see pictures below)
- Fall 2012: [redacted] attended a party at Sayeed's home for his lab.
- June 2013: [redacted] visited Sayeed's home and they worked together in the back yard on a paper that they were writing.
- July 2014: [redacted] came to Sayeed's home for a 4th of July party.
- [redacted]
- March 2016: [redacted] visited Sayeed's home (see pictures below)
- August 2016: [redacted] visited Sayed's home a few weeks before [redacted]



2011: Left: Sayeed and [redacted] with their first prototype. Right: [redacted] holding the prototype lens that he had designed. Photographs taken by Sayeed's wife.

March 2016: [redacted] at Sayeed's home playing with Sayeed's son.

Some Additional Thoughts: [redacted] was the most diversely talented student Prof. Sayeed had the privilege of working with in his 20+ years at Wisconsin. Sayeed opened his home to him, as noted above, and he and his family cared for [redacted] well being.

[redacted]

[redacted]

[redacted]

After the successful prototype demonstration in May 2016, Sayeed was planning to move forward with a fresh start. Sayeed recognized that it had been a very stressful time for the entire group. The other senior graduate student in Sayeed's lab, [redacted] was graduating and planning to leave in June for a job in California starting in August 2016. While there had been significant turn over in the past few years, this was the first time that [redacted] was the only one from the older students who was left in the lab for the summer -- two new students were joining the lab in the Fall. Sayeed could sense that [redacted] was feeling a little down about the fact that he was not done with his Ph.D., and he had several conversations with [redacted] about that. [redacted] expressed his intent to finish in the following year. Sayeed agreed and helped him create a timeline for finishing the remaining tasks (forming a committee, presenting a thesis proposal,

and writing the thesis). [redacted] was planning on taking his preliminary Ph.D. exam (thesis proposal) in November/December 2017, with the intent of defending his thesis the following May or during summer at the latest.

[redacted]

Exhibit C

Email from Sherry Boeger of the Employee Assistance Office Regarding [redacted] Unreadiness for a Facilitated Conversation

update

SHERRY L BOEGER

Mon 1/9/2017 9:40 AM

To: Akbar Sayeed <akbar.sayeed@wisc.edu>;

Hello Akbar,

[redacted]

I wish you well.

Best regards,
Sherry

Sherry Ray Boeger
Employee Assistance Office(EAO) Director
University of Wisconsin-Madison
Lowell Center, Room 226
610 Langdon Street
Madison, WI 53703
Telephone: 608-263-2987
www.eao.wisc.edu

Exhibit D

Some Items from the Report

Recommended Outcomes:

- Recommend further investigation by the Provost under Faculty Policies & Procedures Chapter 9, specifically for abuse of authority and influence.
- Recommend anger management assistance for Professor Sayeed.
- Letter of expectation
- Require that Professor Sayeed conduct himself professionally within student meetings omitting his desire to call his students stupid, using derogative language, or other inappropriate words with his students in any capacity.
- Assist students to transfer to other faculty advisors if that is their desire.
- On-going monitoring of the lab to ensure a change in atmosphere and behavior by Professor Sayeed.

D1: Recommendations of Assistant Dean Jason Jankoski (from page 46 of the report)

Additional information:

- [redacted] tried talking to Prof Vernon-Vernon told him he was too sensitive but then tried to console him
  - Told him it would be wise to go to different group
  - Advised him to maintain composure
- Complained to John Booske and told him he wanted to leave
  - John told him they wanted to keep this under the rug

D2: Comments from one of the interviewed student when he brought his concerns to the attention of the ECE Department (page 59 of the report)

Time to talk tomorrow

Tue, Oct 20, 2015 at 6:24 PM

To: Robert Nowak <nowak@ece.wisc.edu>

Professor Nowak,

Would you have some time tomorrow to talk with me about some serious issues our group is having with professor Sayeed?

Thank you.

D3: Email from [redacted] to Prof. Nowak (from page 76 of the report)

QUESTIONS & RESPONSES:

1) **Are you a M.S. or Ph.D. student? How many years have you been in Professor Chin Sayeed's lab?**

We interviewed 7 students that were in the M.S. program and 2 students who were in the PhD program and switched to an M.S. We also interviewed 1 current PhD student and 1 recent PhD graduate-neither of these students had Professor Sayeed as a final mentor. A number of students stayed for a year or less in the lab and then moved to another lab or did not seek another lab position.

D4: The first question in the questionnaire used by Assistant Dean Jason Jankoski (from page 43 of the report) in which Prof. Sayeed's name is misspelled.

Exhibit E

Scan of a Printout of an Email Prof. Sayeed found on a Departmental Printer in 2001

X-Sender: [redacted]
Date: Fri, 16 Mar 2001 10:09:46 -0600
To: [redacted]
From: [redacted]
Subject: John 2
Cc: [redacted]

On Wednesday there was a question about the date and authorship of the book of John. Here is some of what I found:

From Vincent's Word Studies - "The nearly unanimous tradition of the Church assigns the fourth gospel to John (the apostle). It is unquestionably the work of a Jew, an eye-witness, and a disciple of Jesus. It was probably written toward the close of the first century, and therefore later than the other three Gospels. According to the earliest evidence, it was composed at Ephesus.....

..... (the dominant theory is that) .... John wrote the fourth Gospel as a supplement to its predecessors, in order to supply what was wanting in the synoptic narrative. This Gospel is indeed supplementary in that the writer constantly assumes certain facts are already known to his readers, and adds other facts from his own special information. But the Gospel itself expressly disclaims all intention to be complete (21:25), and is an original conception, both in form and substance, having a distinct plan of its own, and presenting a fresh aspect of the person and teaching of our Lord. It is the picture of him who paints, not because others have failed to catch the ideal he would represent, but because his heart is full and he must speak....."

All the other sources I have (remarks in various Bibles and handbooks) place the writing after the destruction of the temple in A.D. 70 and before John's death in about A.D. 100, most likely between A.D. 85-90. I found no mention of any other possibilities.

Regarding the study of John 2 for next week -- There are two events presented in this chapter. 1) Turning the water into wine; 2) Jesus clearing the temple of the moneychangers and merchants. Depending on the discussion, we may or may not get through both of these.

Let's remember when reading these to view them in light of John's purpose for writing, as revealed in John 20:30-31.

1) Jesus turns water into wine (vs. 1-11)
a) What about miracles? How do we view these in light of our scientific training? How would we respond to a skeptic who claims that miracles are impossible and thus the Bible can't be true?
b) Why did John choose to include this miracle? What purpose did miracles serve in John's view?
c) What does this account tell me about the character of Jesus and how I can expect Him to intervene in my life?

2) Jesus clears the temple (vs. 12-25)
a) Why did Jesus clear the temple? What was so offensive that He acted this way?
b) What did Jesus claim as the basis for His authority in clearing the temple? Did the Jews get it?
c) Why did Jesus not entrust Himself to men? What does this say about His deity?
d) How does this account parallel what Jesus wants to do in my life?

--

[redacted]
ECE Department
University of Wisconsin
1415 Engineering Drive
Madison, WI 53706
[redacted]

Exhibit F

Prof. Sayeed's CV

Akbar M. Sayeed

University of Wisconsin–Madison
Department of Electrical and Computer Engineering
Tel: (608) 265-4731, Fax: (608) 262-1267
Email: akbar@engr.wisc.edu, Web: http://dune.ece.wisc.edu/
Google Scholar: 9800+ citations; h-index: 42

Research Interests

Wireless communication and sensing, wireless channel measurement and modeling, machine learning and data analytics, statistical signal processing, communication and information theory, harmonic analysis, time-frequency representations, prototype and testbed development, and technology development and transfer.

Education

1996	University of Illinois-Urbana	Ph.D. in Electrical and Computer Engineering
1993	University of Illinois-Urbana	M.S. in Electrical and Computer Engineering
1991	University of Wisconsin-Madison	B.S. in Electrical and Computer Engineering

Positions

2008-present	University of Wisconsin-Madison	Professor
2003-2008	University of Wisconsin-Madison	Associate Professor
1997-2003	University of Wisconsin–Madison	Assistant Professor
1996–1997	Rice University	Postdoctoral Research Fellow
1991–1996	University of Illinois–Urbana	Research Assistant

Awards and Honors

2016	Leading an NSF Research Coordination Network on Millimeter-Wave Wireless Technology
2016	Invited Participant of a Kickoff Event for a new $400M, 7-year NSF-led Advanced Wireless Research Initiative
2015	Steering Committee Member: NSF Workshop on the *Enhancing Access to the Radio Spectrum (EARS)* program
2012	IEEE Fellow
2003	UW Grainger Electrical and Computer Engineering Junior Faculty Fellowship
2001	Office of Naval Research Young Investigator Award
1999	National Science Foundation Faculty Early CAREER Development Award
1996	Robert T. Chien Memorial Award for outstanding Ph.D. research (U. Illinois)
1992–1995	Schlumberger Fellowship (U. Illinois)

Research Support

2017-2020	NSF	NeTS: SHF: Medium: Integrated Design and Optimization of Scalable Millimeter-Wave Multi-beam MIMO Networks for Gigabit Mobile Access; PI: A. Sayeed, co-PI: P. Ramanathan, $1,189,378; Collaborative project with WSU (PI: D. Heo, and co-pI: S. Gupta); Wisconsin (lead) share: $660,900, WSU share: $528,478
2016-2019	NSF	RCN: Millimeter-Wave Wireless Research: Hardware, Communication, Computation, and Networking ; PI: A. Sayeed, co-PI: X. Zhang; $300,000
2016-2019	NSF	II-New: A Beamspace Multiple Input Multiple Output (MIMO) Testbed for Centimeter-Wave and Millimeter-Wave Wireless; PI: A. Sayeed, co-PI: P. Ramanathan; $775,000
2015-2017	WARF	Accelerator Program, CAP-MIMO Phase III Prototype Development, PI: A. Sayeed; $128,000
2015-2017	NSF	EAGER: Proof-of-Concept of a New MIMO Transceiver for Addressing Beam Squint in Wideband High-Dimensional Arrays; PI: A. Sayeed; $200,000
2014-2017	NSF	PFI-AIR: Beamspace MIMO Transceiver Prototype for Gigabit Mobile Wireless Access at Millimeter-Wave Frequencies; PI: A. Sayeed, co-PI: C. Navis (UW Business); $200,000
2012-2016	NSF	EARS: Beamspace Communication Techniques and Architectures for Enabling Gigabit Mobile Wireless at Millimeter-wave Frequencies; PI: A. Sayeed, co-PI: N. Behdad; $500,000
2013-2015	DARPA	DARPA 100G Program - Electro-optic transceivers for Millimeter-Wave Wireless Links - subcontract from Battelle Memorial Institute; PI: A. Sayeed; $55,000
June 2010-	WARF	Continuous Aperture Phased MIMO; PI: A. Sayeed. Wisconsin Alumni Research Foundation (WARF) *Accelerator Competition Grant for Technology Commercialization*; Phases I, II, and III; $212,000
2010–2013	NSF	EAGER: A Novel Hybrid Analog-Digital Architecture for Optimum Agile Wireless Communications Using Discrete Lens Arrays; PI: A. Sayeed, co-PI: N. Behdad; $150,000
2009-2011	UW	Cognition and Adaptation in Wireless Networks; $35,000
2006–2010	NSF	An Integrated PHY-MAC Approach for Secure Open-Access Wireless Networks; co-PI with S. Banerjee (Wisconsin) and A. Perrig (Carnegie Mellon); $330,000
2004–2008	NSF	Communication over Dispersive Wireless Channels: Theory and Methods Based on Physical Principles; PI, joint with V. Veeravalli (Illinois); $500,000
2001–2005	NSF (ITR)	Integrated Signal Processing and Antenna Array Design for Diversity Wireless Links; PI, joint with Z. Popovic (Colorado); $500,000
2001–2004	ONR (YIP)	Maximal Exploitation of Space-Time Dimensions for Communication in Highly Dynamic Scenarios; PI; $300,000

2001-2002	NSF	Measurement Based Channel Modeling for Coherent Terahertz Communications; co-PI, joint with D. van der Weide and B. Van Veen; $64,000
2000–2003	DARPA	Location-Centric Distributed Computation and Signal Processing in Microsensor Networks; co-PI, joint with P. Ramanathan, Y. Hu, K. Saluja; $1,300,000
1999–2003	NSF	Integrating Antennas, Receivers, and Networks in Mobile Wireless Communications; co-PI, joint with B. Van Veen, R. Agrawal, S. Hagness, D. van der Weide, L. Scharf (Colorado), Z. Popovic (Colorado); $750,000
1999–2004	NSF (CAREER)	An Integrated Digital Signal Processing Framework for Optimized Wireless Communications; PI; $200,000
2000–2001	Wisconsin	Signaling in Canonical Channel Modes for Wireless Networks; $25,000
1999–2000	Wisconsin	Canonical Space-Time Processing in Wireless Communications; $20,000
1998–1999	Wisconsin	New Techniques for Multiuser Wireless Communications; $20,000

Professional Activities

Associate Editor: *IEEE Transactions on Signal Processing* (2013-2015)

Associate Editor: *IEEE Signal Processing Letters* (1999-2002)

Guest Editor: IEEE Journal of Selected Topics in Signal Processing (special issue on signal processing for millimeter-wave wireless communication); R. Heath, N. Gonzalez-Prelcic, S. Rangan, W. Roh, and A. Sayeed (2015-16)

IEEE Journal of Selected Topics in Signal Processing (special issue on Signal Processing and Networking for Dynamic Spectrum Access); A. Swami, R. Berry, A. Sayeed, V. Tarokh and Q. Zhao (2008)

IEEE Journal on Selected Areas in Communications (special issue on Self-organizing Distributed Collaborative Sensor Networks); A. Sayeed, D. Estrin, G. Pottie, and K. Ramchandran (2005)

Technical Committees: Signal Processing for Communications and Networking Technical Committee of the IEEE Signal Processing Society (2007-2012)

Technical Program Committees: 2017 **Workshop Co-Chair**, IEEE VTC Workshop on Millimeter-Wave Channel Measurement, Modeling, and Systems

2017 **Workshop Co-Chair**, Second Workshop of the NSF Research Coordination Network on Millimeter-Wave Wireless Technology

2016 **Workshop Co-Chair**, Kickoff Workshop of the NSF Research Coordination Network on Millimeter-Wave Wireless Technology

2016 **Workshop Co-Chair**, IEEE Globecom Workshop on 5G Wireless Channel Modeling

2016 **Workshop Co-Chair**, IEEE VTC Workshop on Millimeter-Wave Channel Modeling

2014 **Technical Program Co-Chair**, IEEE Workshop on Signal Processing Advances for Wireless Communications (SPAWC)

2007-2013, IEEE Workshop on Signal Processing Advances for Wireless Communications (SPAWC)

2007-2013, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)

2011 IEEE International Symposium on Information Theory (ISIT), St. Petersburg, Russia

2010 International Conference on Cognitive Radio Oriented Wireless Networks and Communications (CrownCom), Cannes, France

2009 IEEE GLOBECOM, Hawaii

2008 **Technical Program Track Chair**, Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA

2008 IEEE GLOBECOM, New Orleans

2008 **Technical Program Co-chair**, IEEE Communication Theory Workshop, St. Croix, US Virgin Islands

2007 **Technical Program Co-chair**, IEEE Statistical Signal Processing Workshop, Madison, WI

2005 ACM Conference on Embedded Networked Sensing Systems (SenSys), San Diego

2005 IEEE Global Communications Conference (GLOBECOM), St. Louis

2005 IEEE Workshop on Signal Processing Advances for Wireless Communications (SPAWC), New York

2004 25-th IEEE International Real-Time Systems Symposium (RTSS), Portugal, Lisbon

2004 International Symposium on Information Processing in Sensor Networks (IPSN), April, Berkeley, CA

2003 IEEE International Conference on Communications (ICC), 2003, Alaska

Fall 2002 IEEE Vehicular Technology Conference (VTC), Vancouver, Canada

Session Organizer: Millimeter-Wave MIMO Wireless Systems, 2017 Asilomar Conference

5G Wireless Panel, 2014 IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC 2014)

Cognitive Wireless Communication and Sensing in Networks, 2006 Military Communications Conference (MILCOM 2006); with B. Daneshrad (UCLA)

Member: IEEE (Fellow), Eta Kappa Nu, Tau Beta Pi

Reviewer:	Various journals and conferences in communications and signal processing, National Science Foundation, Army Research Office, Australian Research Council, Vienna Research Fund, Austrian Research Council, and the Canadian Research Council
Panelist:	Millimeter-wave (mmWave) Measurement and Modeling, International Symposium on Advanced Radio Technologies: Spectrum Mining at mmWave - Digging for Capacity (2017)
	Huawei University Days (2016)
	5G Densification and Enabling Technology, TIA Annual Meeting (2016)
	IEEE WCNC Workshop on Millimeter-Wave Wireless (2016)
	NSF Workshop on Distributed Sensor Networks (2002)
	NSF/ONR Workshop on Signal Processing for Manufacturing and Machine Monitoring (1996)

Courses Taught and Developed

ECE 436	Analog Communication Systems
ECE 437	Digital Communication Systems
ECE 736	Wireless Communications
ECE 330	Signals and Systems
ECE 331	Probability and Statistics
ECE 732	Advanced Digital Signal Processing
ECE 737	Wavelets and Filter Banks

Research Group

Current students:

Visiting scholars:

Previous students, postdocs, and visiting scholars:

[redacted]

Dr. Michail Matthaiou (visiting scholar, summer 2009), Technical University of Munich, currently Se

[redacted]

Prof. Chang-Heon Oh (visiting scholar, 2006-2007), Korea University of Technology and Education

[redacted]

J. Kotecha (postdoc, 2002-2004); Senior Member of Tech. Staff, Freescale, Austin, TX

[redacted]

Z. Hong (postdoc, 2002-03); Canadian Research Centre, Ottawa, CA

[redacted]

University Service

1997-present	Director, Wireless Communication and Sensing Laboratory
1998-present	ECE Openhouse
1999-present	Faculty Recruitment (Systems Area)
2016-2017	ECE Graduate Advisor
2016-2017	ECE Graduate Admissions and Fellowship Committee
2016-2017	ECE Steering Committee
2016-2017	CoE Academic Planning Council
2015-2016	ECE Steering Committee
2015-2016	CoE Academic Planning Council
2015-2016	ECE Graduate Advising (chair)
2014-2015	College of Engineering Equity and Diversity Committee
2014-2015	College of Engineering Academic Planning Council
2014-2015	ECE Graduate Committee (Chair)
2014-2015	ECE Educational Innovation Committee (Online Program in Wireless)
2005-2014	Associate Director, UW Wireless and Sensor Networks (WiSeNet) Consortium
2013-2014	College of Engineering Equity and Diversity Committee
2013-2014	Educational Innovation Committee (Chair)
2013-2014	Strategic Planning Committee
2013-2014	Workload Committee
2012-2013	Faculty Performance Review
2012-2013	Online Education Committee (Chair)
2012-2013	Faculty Recruitment Committee (Communications and Signal Processing)
2010-2011	Faculty Recruitment (Power Systems)
2009-2011	Curriculum and Strategic Planning Committee
2010-2011	Awards Committee
2006-2011	Representative to College Equity and Diversity Committee
2006-2009	Undergraduate Advising
2007-2008	Graduate Admissions and Fellowships
2005-2006	Graduate Admissions and Fellowships
2005-2006	Faculty Performance Review
2003-2004	Eta Kappa Nu Faculty Advisor
2000-2004	Graduate Fellowships
2000-2001	Departmental Seminar Coordinator
1997-1998	Graduate Fellowships
1999-2004	IEEE Student Branch Faculty Advisor

Patents and Invention Disclosures

[1] A. Sayeed, *Radiator Localization*, US patent No. 9,763,216 issued, September 12, 2017.

[2] [redacted]

[3] [redacted]

[4] A. Sayeed and N. Behdad, *Continuous Aperture Phased MIMO*, US patent No. 8,811,511 issued August 19, 2014.

[5] W. Bajwa, A. Sayeed, R. Nowak and J. Haupt, *Method for Probing and Learning Sparse Multipath Wireless Channels*, US Patent No. 8,320,489, issued on Nov. 27, 2012.

[6] A. Sayeed and V. Raghavan, *Method and Apparatus for Maximizing Capacity of Multi-Antenna Communication Systems with Reconfigurable Antenna Arrays*, US patent No. 8,000,732, issued on August 16, 2011.

[7] A. Sayeed and T. Sivanadyan, *Active Wireless Sensing: Method for Rapid Information Retrieval From an Ensemble of Wireless Sensors*, US patent No. 7,881,671 issued on Feb. 1, 2011.

[8] K. Liu and A. M. Sayeed, *Layered Space-Time Processing in a Multiple Antenna System*, US patent No. 7,218,906 issued on May 15, 2007.

[9] E. N. Onggosanusi, B. D. Van Veen and A. M. Sayeed, *Channel Aware Optimal Space-Time Signaling for Wireless Communication Over Wideband Multipath Channels*, US patent No. 7,110,378 issued on September 19, 2006.

[10] T. A. Kadous and A. M. Sayeed, *Method and System for Multi-Carrier Multiaccess Reception in the Presence of Imperfections*, US patent No. 6,654,408 issued on November 25, 2003.

Book Chapters

[1] [redacted]

[2] A. M. Sayeed and T. Sivanadyan, "Wireless Communication and Sensing in Multipath Environments Using Multi-antenna Transceivers," *Handbook on Sensor and Array Processing*, (S. Haykin and R. Liu, eds.), IEEE-Wiley, 2010.

[3] A. M. Sayeed, "Object Detection and Classification in Sensor Networks," in *Frontiers in Distributed Sensor Networks* (R. Brooks and S. Iyengar, eds.), CRC Press, 2004.

[4] A. M. Sayeed, "Communication over Linear Dispersive Channels: A Time-Frequency Perspective,"in *Time Frequency Signal Analysis and Processing* (B. Boashash ed.), pp. 549-557, Elsevier, Nov. 2003.

[5] A. M. Sayeed, "Optimal Time-Frequency Detectors," in *Time-Frequency Signal Analysis and Processing* (B. Boashash ed.), pp. 500-509, Elsevier, Nov. 2003.

[6] A. M. Sayeed and B. Aazhang, "Communication over Multipath Fading Channels: A Time-Frequency Perspective," in *Wireless Communications: CDMA versus TDMA* (S. G. Glisic and P. A. Leppanen eds.), pp. 73–98, Kluwer Academic Publishers, 1997.

Technical Reports

[1] [redacted]

[2] Y. Zhou, M. Herdin, A. M. Sayeed and E. Bonek, "Experimental Study of MIMO Channel Statistics and Capacity via the Virtual Channel Representation," UW-ECE Technical Report, February 2007.

[3] J. Kotecha and A. M. Sayeed, "Canonical Statistical Modeling and Capacity Analysis of Correlated MIMO Channels," UW-ECE Technical Report, February 2004.

[4] A. M. Sayeed, "A Statistical Signal Modeling Framework for Integrated Design of Sensor Networks," UW-ECE Technical Report, October 2003.

Journal Publications

[1] X. Gao, L. Dai, A. Sayeed, "Low RF-Complexity Technologies for 5G Millimeter-Wave MIMO Systems with Large Antenna Arrays", submitted for publication, 2016.

[2] R. Heath, N. Gonzalez-Prelcic, S. Rangan, W. Roh, and A. Sayeed, "An Overview of Signal Processing Techniques for Millimeter-Wave MIMO Systems", *IEEE Journal on Selected Topics in Signal Processing* , April 2016.

[3] H. Mehrpouyan, M. R. Khanzadi, M. Matthaiou, A. Sayeed, R. Schober, and Y. Hua, "Improving Bandwidth Efficiency in E-band Communication Systems," *IEEE Communications Magazine*, March 2014.

[4] A. Fish, S. Gurevich, R. Haddani, A. Sayeed, and O. Schwartz, "Delay-Doppler Channel Estimation in Almost Linear Complexity," *IEEE Transactions on Information Theory*, November 2013.

[5] T.-H. Chou, S. Draper and A. Sayeed, "Secret Key Generation from Sparse Wireless Channels: Ergodic Capacity and Secrecy Outage," *IEEE Journal on Selected Areas in Communications*, pp. 1751-1764 September 2013.

[6] M. Malloy and A. Sayeed, "Re-visiting Spread Spectrum Detection in Multipath," *IEEE Transactions on Signal Processing*, pp. 4330-4340, September 2013.

[7] [redacted]

[8] Y. Liu, S.C. Draper, and A.M. Sayeed, " Exploiting Channel Diversity for Secret Key Generation From Multipath Fading Randomness", the *IEEE Transactions on Information Forensics and Security*, pp.1484-1497, October 2012.

[9] T.-H. Chou, S. Draper, and A. Sayeed, "Key Generation Using External Source Excitation: Capacity, Reliability and Secrecy Exponent", *IEEE Transactions on Information Theory*, pp. 2455-2474, April 2012.

[10] V. Raghavan, A. Sayeed, and V. Veeravalli, "Semiunitary Precoding for Spatially Correlated MIMO Channels," *IEEE Transactions on Information Theory*, pp. 1284-1298, March 2011.

[11] V. Raghavan and A. Sayeed, "Sub-linear Capacity Scaling Laws for Sparse MIMO Channels," *IEEE Transactions on Information Theory*, pp. 345-364, January 2011.

[12] V. Raghavan, J. Kotecha and A. Sayeed, "Why Does the Kronecker Model Result in Misleading Capacity Estimates?," *IEEE Transactions on Information Theory*, pp. 4843-4864, October 2010.

[13] W. Bajwa, J. Haupt, A. Sayeed, and R. Nowak, "Compressed Channel Sensing: A New Approach to Estimating Sparse Multipath Channels," *Proc. IEEE (special issue on Sparse Signal Processing)*, June 2010. **Invited**.

[14] T. Sivanadyan and A. M. Sayeed, "Active Wireless Sensing: A Versatile Framework for Information Retrieval in Sensor Networks," *IEEE Transactions on Signal Processing*, Jan 2010.

[15] M. Matthaiou, Y. Kopsinis, D. Laurenson and A. Sayeed, "Ergodic Capacity Upper Bound for Dual MIMO Ricean Systems: Simplified Derivation and Asymptotic Tightness," *IEEE Transactions on Communications*, Dec. 2009.

[16] K. Liu, Z. Hong, N. Boston, and A. Sayeed, "Space-Time Code Design Based on Algebraic Number Theory," *IEEE Transactions on Information Theory*, June 2009.

[17] V. Raghavan, V. Veeravalli and A. Sayeed, "Quantized Multimode Precoding in Spatially Correlated Multi-Antenna Channels," *IEEE Transactions on Signal Processing*, Dec. 2008.

[18] G. Hariharan, V. Raghavan, and A. M. Sayeed, "Capacity of Sparse Wideband Channels with Partial Channel Feedback," *European Transactions on Telecommunications* (special issue on New Directions in Information Theory), April 2008.

[19] W. Bajwa, J. Haupt, A. Sayeed and R. Nowak, "Joint Source-Channel Communication for Distributed Estimation in Sensor Networks," *IEEE Transactions on Information Theory* (special issue on Models, Theory and Codes for Relaying and Cooperation in Communication Networks), pp. 3629-2653, Oct. 2007.

[20] V. Raghavan, G. Hariharan, and A. Sayeed, "Capacity of Sparse Multipath Channels in the Ultra-Wideband Regime," *IEEE Journal on Selected Topic in Signal Processing* (special issue on Performance Limits of Ultra-Wideband Systems), pp. 357-371, Oct. 2007.

[21] V. Raghavan, R. Heath, and A. Sayeed, "Systematic Codebook Designs for Quantized Beamforming in Correlated MIMO Channels," *IEEE Journal on Selected Areas in Communications* (special issue on Optimization of MIMO Transceivers for Realistic Communication Networks), pp. 1298-1310, September 2007.

[22] K. Liu, H. El Gamal and A. Sayeed, "Decentralized Inference Over Multiple Access Channels," *IEEE Transactions on Signal Processing*, pp. 3445-3455, July 2007.

[23] A. Sayeed and V. Raghavan, "Maximizing MIMO Capacity in Sparse Multipath with Reconfigurable Antenna Arrays," *IEEE Journal on Special Topics in Signal Processing* (special issue on Adaptive Waveform Design for Agile Communications and Sensing), pp. 156-166, June 2007.

[24] K. Liu and A. Sayeed, " Type-based Decentralized Detection in Wireless Sensor Networks," *IEEE Transactions on Signal Processing*, pp. 1899-1910, May 2007.

[25] V. Raghavan and A. Sayeed, "Weak Convergence and Rate of Convergence of MIMO Capacity Random Variable," *IEEE Transactions on Information Theory*, vol. 52, no. 8, pp. 3799-3809, August 2006.

[26] Y. Zhou and A. M. Sayeed, "Theoretical Study of Mobile Station Multi-polarization Antenna Diversity," the *IEEE Transactions on Vehicular Technology*, pp. 256-269, Jan. 2006.

[27] K. Liu and A. M. Sayeed, "An Iterative Extension of BLAST Decoding Algorithm for Layered Space-Time Signals," *IEEE Transactions on Communications*, pp. 1754-1761, October 2005.

[28] Y. Zhou, S. Rondineau, D. Popović, A. Sayeed, and Z. Popović, "Virtual Channel Space-Time Processing With Dual-Polarized Discrete Lens Antenna Arrays," *IEEE Transactions on Antennas and Propagation* (special issue on Antennas and Propagation Applications), pp. 2444-2455, August 2005.

[29] Y. Liang, V. Veeravalli, A. Sayeed, "Correlated MIMO Wireless Channels: Capacity, Optimal Signaling and Asymptotics," *IEEE Transactions on Information Theory*, vol. 5, pp. 2058-2072, June 2005.

[30] J. Zhang, A. M. Sayeed, and B. D. Van Veen, "Reduced state MIMO sequence estimation with applications to EDGE Systems,"*IEEE Transactions on Wireless Communications*, pp. 1040-1049, May 2005.

[31] J. Kotecha, V. Ramachandran and A. Sayeed, "Distributed Multi-target Classification in Wireless Sensor Networks," the *IEEE Journal on Selected Areas in Communications* (special issue on sensor networks), pp. 703-713, April 2005.

[32] J. Zhang, A. M. Sayeed, and B. D. Van Veen, "Optimal Space-Time Transceiver Design for Selective Wireless Broadcast with Channel Side Information," *IEEE Transactions on Wireless Communications*, pp. 2040-2050, Nov. 2004.

[33] K. Liu, T. Kadous and A. M. Sayeed, "Orthogonal Time-Frequency Signaling for Doubly Dispersive Channels," *IEEE Transactions on Information Theory*, pp. 2583-2603, Nov. 2004.

[34] A. D'Costa, V. Ramachandran and A. Sayeed,"Distributed Classification of Gaussian Space-Time Sources in Wireless Sensor Networks," *IEEE Journal on Selected Areas in Communications* (special issue on sensor networks), pp. 1026-1036, August 2004.

[35] T. Kadous and A. M. Sayeed, "An Integrated Framework for OFDM Reception in the Presence of Phase Noise, Frequency Offsets and Fast Fading," the *IEEE Transactions on Wireless Communications*, vol. 3, issue 4, pp. 1224-1235, July 2004.

[36] K. Liu and A. M. Sayeed, "Space-Time D-Block Codes via the Virtual MIMO Channel Representation," the *IEEE Transactions on Wireless Communications*, vol.3, pp. 982-991, May 2004.

[37] J. H. Kotecha and A. M. Sayeed, "Transmit Signal Design for Optimal Estimation of Correlated MIMO Channels," *IEEE Transactions on Signal Processing*, pp. 546-557, Feb. 2004.

[38] K. Liu, V. Raghavan and A. M. Sayeed, "Capacity Scaling and Spectral Efficiency in Wideband Correlated MIMO Channels," *IEEE Transactions on Information Theory* (special issue on MIMO systems), pp. 2504-2526, October 2003.

[39] R. Brooks, P. Ramanathan and A. M. Sayeed, "Distributed Target Classification and Tracking in Sensor Networks," *Proceedings of the IEEE*, pp. 1163-1171, August 2003. **Invited.**

[40] Z. Hong, K. Liu, R. Heath, A. M. Sayeed, "Spatial Multiplexing in Correlated Fading Via the Virtual Channel Representation," *IEEE Journal on Selected Areas in Communications* (special issue on MIMO Systems and Applications), vol. 21, no. 5, pp. 856-866, June 2003.

[41] A. Ganesan and A. M. Sayeed, "A Virtual Input-Output Framework for Transceiver Analysis and Design for Multipath Fading Channels," *IEEE Transactions on Communications*, pp. 1149-1161, June 2003.

[42] E. N. Onggosanusi, A. M. Sayeed, and B. D. Van Veen, "Efficient Signaling Schemes for Wideband Space-Time Wireless Channels Using Channel State Information," *IEEE Transactions on Vehicular Technology*, pp. 1-13, Jan. 2003.

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Tutorial

"Wireless Sensor Networks," (with D. Estrin and M. Srivastava), *8th ACM Conference on Mobile Computing and Networking (Mobicom 2002)*, September 24, 2002.

Keynote and Plenary Talks

"Wideband (and Massive) MIMO for Millimeter-Wave Mobile Networks: Recent Results on Theory, Architectures, and Prototypes," Keynote Lecture, *Workshop on Millimeter Wave-Based Integrated Mobile Communications for 5G Networks, 2017 IEEE Wireless Communication and Networking Conference*, San Francisco, March 2017.

"Multi-beam MIMO for Millimeter-Wave Wireless: Architectures, Prototypes, and 5G Use Cases," Keynote Lecture, *Workshop on Millimeter Wave-Based Integrated Mobile Communications for 5G Networks, 2016 IEEE Wireless Communication and Networking Conference*, April 3, 2016, Doha, Qatar.

"Beamspace MIMO Architectures for Millimeter-Wave Wireless," Plenary Lecture, *International Workshop on Emerging MIMO Technologies* as part of *2015 IEEE International Conference on Computing, Networking and Communications (ICNC)*, Feb. 16, 2015, Annaheim, CA.

"Millimeter-Wave MIMO Architectures for 5G Wireless," Plenary Lecture at the *2014 IEEE Globecom Workshop on Emerging Technologies for 5G Wireless Cellular Networks*, Dec 8., 2014, Austin, TX.

"Wireless Sensor Networks: Interplay between Distributed Sensing, Communications and Learning", Keynote Lecture, *Picture Coding Symposium*, San Francisco, CA, December 15-17, 2004.

Invited Lectures and Presentations

"Millimeter-Wave Wireless: A Cross-Disciplinary View of Research and Technology Development," First ACM Workshop on Millimeter-Wave Networks and Sensing Systems, Snowbird, UT, October 16, 2017.

"Millimeter-wave MIMO: Basic Theory, Architectures, and Technology Development," Huawei University Days, Chicago, Aug 4-5, 2016.

"The Next Wireless Frontier: Challenges and Opportunities at Millimeter-wave and Higher Frequencies," Hawaii Center for Advanced Communication, University of Hawaii, December 2, 2014.

"Beamspace Communication Techniques and Architectures for Enabling Gigabit Mobile Wireless at Millimeter-wave Frequencies," NSF EARS (efficient access to the radio spectrum) program Kickoff Workshop, October 7-8, 2013.

"The Next Wireless Frontier: Challenges and Opportunities at Millimeter-wave and Higher Frequencies," Virginia Tech, April 22, 2013.

"The Next Wireless Frontier: Challenges and Opportunities at Millimeter-wave and Higher Frequencies," Iowa State University, April 13, 2012.

"Harnessing the Wireless Spectrum: Challenges and Opportunities," Washington State University, October 4, 2011.

"Harnessing the Wireless Spectrum: Opportunities and Challenges," Boston University, March 2009.

"Cognition and Security in Wireless Networks," LUMS School of Science and Engineering, Lahore, Pakistan, October 15, 2008.

"Capacity of Correlated MIMO Channels: Channel Power and Multipath Sparsity," Random Matrix Theory and Wireless Communications Workshop, Boulder, CO, July 24, 2008.

"Cognitive Wireless Communication in Time, Frequency and Space," McMaster University, July 20, 2007.

"Cognitive Wireless Communication in Time, Frequency and Space," WINLAB, Rutgers University, April 3, 2007.

"Cognitive Wireless Communication in Time, Frequency and Space," Columbia University, April 2, 2007.

"Cognitive Wireless Communication and Sensing in Time, Frequency and Space," Illinois Center for Wireless Systems, University of Illinois, February 23, 2007.

"Non-coherent Capacity and Reliability of Sparse Multipath Channels in the Wideband Regime," *2nd Workshop on Information Theory and Applications*, UCSD, January 2007.

"Active Wireless Sensing in Time, Frequency and Space," *Workshop on Mathematical Challenges and Opportunities in Sensor Networks*, Institute for Pure and Applied Mathematics, Los Angeles, January 2007.

"Wireless Communications and Sensing in Time, Frequency and Space," Darmstadt University, Germany, July 5, 2006.

"Distributed Inference in Wireless Sensor Networks," University of Frankfurt, Germany, July 4, 2006.

"Distributed Inference in Wireless Sensor Networks," Department of Computer Science, LUMS, Pakistan, June 28, 2006.

"Active Wireless Sensing", 2006 IEEE Communication Theory Workshop, San Juan, May 24, 2006.

"Wireless Communication and Sensing in Time, Frequency and Space", UCLA, November 7, 2005.

"Active Wireless Sensing and Applications in RFID-Enabled Systems," MITRE Workshop on Netted Sensors, October 26, 2005.

"Wireless Communications and Sensing: A Physical Perspective," Qualcomm, April 28. 2005.

"Multi-antenna Wireless Channels: New Results on Modeling, Optimal Signaling and Capacity," Northwestern University, November 24, 2004.

"Multi-antenna Wireless Communications, Sensor Networks, and RFID," 3M Visit, University of Wisconsin, September 29, 2004.

" Sensor Networks, Antenna Array Systems and RFID," RFID Industry Workgroup Meeting, UW E-Business Consortium, Madison, WI, August 14, 2004.

"Correlated MIMO Channels: Modeling, Capacity and Coding," Stanford University, December 5, 2003.

"A Statistical Signal Modeling Framework for Optimizing Sensor Networks," *IEEE Statistical Signal Processing Workshop*, St. Louis, MO, September 29, 2003.

"A Virtual Representation for Multi-Antenna Wireless Channels," EECS Department, University of California at Berkeley, April 23, 2003.

"A Virtual Representation for Multi-Antenna Wireless Channels," Program on Applied and Computational Mathematics Colloquium, Princeton University, February 10, 2003.

"A Virtual Representation for Time- and Frequency-Selective MIMO Channels," FTW, Vienna, Austria, November 15, 2002.

"A Virtual Representation for Time- and Frequency-Selective MIMO Channels," ETH, Zurich, Switzerland, November 13, 2002.

"Deconstructing Multi-Antenna Wireless Channels," University of Hawaii, October 29, 2002.

"Deconstructing Multi-Antenna Fading Channels," University of Rome "La Sapienza", July 11, 2002.

"Deconstructing Multi-Antenna Wireless Channels," Department of Electrical Engineering, University of Washington-Seattle, April 15, 2002.

"Multi-Antenna Wireless Channels Made Simple," Chaos and Complexity Seminar, Physics Department, University of Wisconsin-Madison, April 9, 2002.

"Deconstructing Multi-Antenna Wireless Channels," Distinguished Lecture Series, Electrical and Computer Engineering, Illinois Institute of Technology, February 15, 2002.

"Orthogonal Time-Frequency Signaling Over Doubly Dispersive Channels," Department of Electronic Engineering, Unviversity of York, England, January 21, 2002.

"Deconstructing MIMO Wireless Channels," Centre for Telecommunications, King's College, Unviversity of London, January 14, 2002.

"Modeling and Capacity of MIMO Fading Channels," Motorola Laboratories, Schaumburg, IL, December 17, 2001.

"Deconstructing Multi-Antenna Wireless Channels," Department of Electrical Engineering, University of Southern California, November 8, 2001.

"Deconstructing Multi-Antenna Wireless Channels," Department of Electrical Engineering, Stanford University, November 7, 2001.

"Deconstructing Space-Time Channels," Department of Electronic Engineering, University of York, August 20, 2001.

"Deconstructing Space-Time Channels," Department of Electrical and Computering Engineering, Ohio State University, May 22, 2001.

"Canonical Space-Time Modes Based Receivers," Wireless Communications Group, Texas Instruments, Dallas, TX, February 7, 2001.

"Modeling and Capacity of Multi-Antenna Multipath Channels," Department of Electrical and Computer Engineering, George Washington University, December 7, 2000.

"Modeling and Capacity of Multi-Antenna Multipath Channels," Department of Electrical and Computer Engineering, University of Colorado, Boulder, November 16, 2000.

"Integrated Design of CDMA Transceivers Via Canonical Space-Time Modes," Mobile Communications Group, Eurecom Institute, Sophia Antipolis, France, June 19, 2000.

"WINSPAR's Approach to Signaling, Reception and Dynamic Resource Allocation," Advanced Systems Technology, Rockwell Collins, Cedar Rapids, IA, May 24, 2000.

"WINSPAR's Approach to Signaling, Reception and Dynamic Resource Allocation," Motorola Labs, Schaumburg, IL, April 28, 2000

"Integrated Design of CDMA Transceivers Via Canonical Space-Time Modes," Department of Electrical Engineering, Cornell University, March 13, 2000.

"Wireless Communication in Canonical Channel Modes," Wireless Communications Group, Texas Instruments, Dallas, TX, January 20, 2000.

"Signal Processing Using Wavelets and Time-Frequency Representations," Chaos and Complex Systems Seminar, Physics Department, University of Wisconsin, December 14, 1999.

"The Holy Grid of Wireless Communications," Systems Seminar, Department of Electrical and Computer Engineering, University of Wisconsin, December 1, 1999.

"Wireless Communication in Canonical Channel Modes," Department of Electrical Engineering and Computer Science, University of Illinois at Chicago, October 15, 1999.

"Canonical Space-Time Processing for Multiuser Wireless Communications," Wireless Communications Group, Texas Instruments, Dallas, TX, July 27, 1999.

"Canonical Space-Time Processing for Multiuser Wireless Communications," Nokia Research Laboratory, Irving, TX, July 26, 1999.

"An Integrated Framework for Space-Time Processing in Multisuer Wireless Communications," Digital Communications Research Department, Bell Laboratories, Holmdel, NJ, June 21, 1999.

"Signal Processing in Canonical Space-Time Coordinates for Multiuser Wireless Communications," Department of Electrical and Computer Engineering, University of Minnesota, April 23, 1999.

"Signal Processing in Canonical Spatio-Temporal Coordinates for Wireless Communications," Motorola Cellular Infrastructure Group, Arlington Heights, IL, March 5, 1999.

"Interference-Resistant Timing Acquisition Over Multipath Fading Channels," Department of Electrical and Computer Engineering, Rice University, June 5, 1998.

"Channel-Based Signal Processing in Mobile Wireless Communications," Department of Electrical Engineering, University of Carlos III, Madrid, Spain, February 9, 1998.

"Joint Multipath-Doppler Diversity in Fast Fading Mobile Wireless Channels," Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, November 24, 1997.

"Communication Over Multipath Fading Channels: A Time-Frequency Perspective," 8th International Conference on Personal, Indoor and Mobile Radio Communications, Helsinki, Finland, September 1, 1997.

"Optimal Detection Using Time-Frequency Representations and Wavelets," Faculty of Electrical Engineering, Ghulam Ishak Institute of Technology, Topi, Pakistan, January 10, 1997.

"Time-Frequency Representations and Optimum Detection," Department of Electrical and Computer Engineering, University of Wisconsin–Madison, December 2, 1996.

"Statistical Signal Processing Using Time-Frequency and Wavelets ," Department of Electrical Engineering and Computer Science, The University of Michigan, October 26, 1996.

"A Statistical Framework for Time-Frequency and Wavelet Analysis," Department of Electrical Engineering, The Michigan State University, October 24, 1996.

"A Statistical Framework for Time-Frequency and Wavelet Analysis," Department of Electrical and Computer Engineering, Rice University, October 22, 1996.

"Statistical Time-Frequency Analysis," Department of Electrical Engineering, The Ohio State University, June 3, 1996.

Personal

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