



Benjamin M. Statler College of Engineering and Mineral Resources
Lane Department of Computer Science and Electrical Engineering

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To whom it may concern:

I am writing this letter to provide a strong recommendation for the professional services of David E. Bakken, Ph.D.

I collaborated with Dr. Bakken in both teaching and research for close to 10 years. Along with 2 other professors, we co-developed a unique interdisciplinary class with both electrical engineers (not all power students) and computer science students. This class was very useful for the students and resulted in a publication¹, and was taught for multiple years at Washington State University.

But more significant is our research collaboration. He had already supervised research on GridStat, a novel publish-subscribe data delivery middleware system to provide the high availability and super-fast performance required in the power grid; for example, some very fast remedial action schemes (RAS) have to operate in 15 msec over hundreds of miles. After this, we had continued collaboration for the multiple projects supported by NSF I/UCRC PSERC, NSF and US Department of Energy. His fundamental observation was that the power grid needed more than just communications: it needed fast coordination, too. His DCBlocks (distributed computing blocks) system thus offers up (very) high-level primitives from his applied distributed computing background to support distributed agreement (consensus) and other similar algorithms. This includes atomic (all-or-none) multicast (ABCAST), leader election, group membership, and others. This was fully implemented in an outstanding MS thesis by Dr. Bakken's student, Shwetha Niddodi [Nid15].

We have to date published 6 publications based on DCBlocks, which is quite remarkable given that it was based on just one MS thesis, although collaborating with multiple students within our research group. Below is a table of these publications. While the details of each "block" are beyond the scope of this letter, the thing to note in this table is that all but one of the power algorithms utilize multiple blocks. For the references, see the bibliography section at the end of this letter. Beyond this table, this collaboration was also very key to a 2017 PhD dissertation of my student, Hyojong Lee, whose doctoral committee Dr. Bakken obviously served on, as well as research conducted by my postdoctoral fellow, Vignesh Krishnan.

¹ Anurag Srivastava, Carl Hauser, and David Bakken. "[Study Buddies: Computer Geeks and Power Freaks are learning Smart Systems Together at Washington State](#)", *IEEE Power & Energy Magazine*, 11(1), January/February 2013, 39–43.



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Dr. Bakken knows the power grid more than any other computer scientist that I know. His 25+ years of working closely with power researchers is a big asset to any electric power research program or corporate R&D. I thus offer my high recommendation for him in such capacities.

Sincerely,

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Decentralized Power App	DC Blocks Utilized	Pub
Distributed Voltage Stability	Group Membership, Leader Election, ABCAST	[LNS+16] [LSK+22]
Distributed State Estimation	Group Membership, Leader Election, ABCAST	[LSA+16]
Distributed Remedial Action Schemes	Group Membership, Scalar Election, ABCAST	[LSA+16]
Decentralized Wind Power Monitoring & Control	Group Membership, Leader Election, ABCAST	[KLA+17]
Distributed Frequency Control	Group Discovery, Group Membership, Leader Election, Matrix Consensus, ABCAST	[BAS+17]
Decentralized Optimal Power Flow	Group Management, Matrix Consensus, ABCAST	[KGL+18]
Decentralized Reactive Control	Group Management, Vector Consensus	[KLA+17]
Decentralized Inverter Control	Group Management	[BAS+17]

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<https://ieeexplore.ieee.org/document/8101783>
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