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Abstract for an Invited Paper  
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### **NANOGrav: Building a Galactic Scale Gravitational Wave Observatory<sup>1</sup>**

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Gravitational waves, or ripples in spacetime, are a key prediction of Einstein's theory of General Relativity. A massive worldwide effort is underway to detect these waves using a variety of techniques. The NANOGrav (North American Nanohertz Observatory for Gravitational Waves) collaboration aims to detect and characterize these waves at low frequencies through ultra-precise timing of an array of millisecond pulsars. The primary expected sources are supermassive black hole binaries, which could be detectable as a stochastic background or as individual sources. I will give an overview of the observational strategies and detection algorithms used for various source classes. I will describe the dramatic gains in sensitivity that are expected from discoveries of additional millisecond pulsars, more sensitive instrumentation, improved detection algorithms, and international collaboration. Finally, I will discuss the likely time to gravitational wave detection using pulsar timing under various scenarios.

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<sup>2</sup>On behalf of the NANOGrav Collaboration (<http://nanograv.org>)