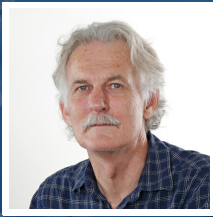


# Incorporating Graphene Materials into Technology



Walt de Heer

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## CURRENT RESEARCH

On the cusp of new materials development, graphene materials could revolutionize the technology industry

Today's technology, which is based on silicon development, has nearly reached its limit. While silicon is a useful material, it's not boundless. What this means is without new materials, the increase in technology efficiency will end and seriously impact the American economy. Dr. Walt de Heer at Georgia Institute of Technology in Georgia has a solution. He is researching the enormous potential that graphene materials can bring to the electronics industry. Specifically to target three important aspects of design: size, heat and speed.

Size - graphene can be reduced to sizes as small as a few nanometers - ten times smaller than the smallest sizes silicon can reach.

Heat- the transfer of heat with graphene is much more efficient which will keep computers from overheating.

Speed -graphene appears to be able to work at terahertz speed, 1000 times faster than gigahertz.

In the past decade Dr. de Heer's team have made tremendous strides in developing graphene electronics and graphene science. They are recognized as world leaders in the field.

Recently they have overcome several of the greatest impediments towards further progress, which is a demonstration of ballistic transport in graphene nanostructures, the development of record breaking prototype transistor devices, and the development of a viable semiconducting form of graphene, which is an enabling step to produce digital electronics.

He estimates that proof of principle devices will be demonstrated within 2 years in optimal conditions (that is, transistors that significantly out-perform silicon in at least one key property: speed, size, heat dissipation). In the same time frame he expects to...

## AFFILIATION



Georgia Institute of Technology

## EDUCATION

- B.S. in Physics 1976 ,University of California, Berkeley
- M.S. in Physics 1979 ,University of California
- Ph.D. in Physics 1985 ,University of California, Berkeley
- Postdoctoral Fellow in Physics 1987 ,University of California, Berkeley

## AWARDS

- Scientific American 50: SA 50 Winners and Contributors, 2006
- W.M. Keck Foundation Grant, 2007
- Faculty Award, 2007
- Potential Nobel Prize Nature Journal

## RESEARCH AREAS

Technology, Nanotechnology

## FUNDING REQUEST

Dr. de Heer has intensive collaborations with scientists around the world. They work particularly with Robert Haddon (USC), Ted Norris (U. Michigan), Albert Fert (Nobel Prize, U. Paris), Christoph Tegenkamp (U. Hanover Germany), Ed Conrad (GIT), Zhigang Jiang (GIT). Contributions will help support the \$1M costs for the next five years in direct research funding. Funding will also support a research group of graduate students, postdoctoral fellows, and a senior researcher.

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