PURITY AND DISPERSION MEASUREMENT ISSUES WORKSHOP ON SINGLE WALLED CARBON NANOTUBES
AGENDA

NIST, Gaithersburg, MD, Green Auditorium

Tuesday, May 27th

7:30am	**REGISTRATION AND CONTINENTAL BREAKFAST**	
8:30	Welcome	Karen Brown, Deputy Director, NIST Minoo Dastoor, Senior Advisor to the Associate Administrator for Aerospace Technology, NASA
8:50	Workshop Purpose	Brad Files, Deputy Chief, Materials & Processes Branch, NASA-Johnson Space Center Steve Freiman, Deputy Director, Materials Science and Engineering Laboratory, NIST

SESSION ONE – PLENARY

Session Chair: Sivaram Arepalli

9:00	Plenary Talk: Nanotubes: Applications and the Need for Standards	Richard E. Smalley/ Rice
9:45	*Discussion*	
10:00	**BREAK**	

SESSION TWO – NANOTUBE PURITY 1

Session Chair: Ray Baughman

10:15	JSC Protocols for Purity and Dispersion of SWCNTs	Pasha Nikolaev/NASA-JSC
10:40	*Discussion*	
10:50	Purification and Dispersion of Single Walled Carbon Nanotubes	Bhabendra Pradhan/ Columbian Chemicals
11:15	*Discussion*	
11:25	Quantitative Analysis of Single-Wall Carbon Nanotubes	Masako Yudasaka/NEC
11:50	*Discussion*	
12:00	**LUNCH**	

SESSION THREE – NANOTUBE PURITY 2

Session Chair: Bob Hauge

1:00	Temperature Programmed Techniques to Help Identify Different Fractions of Carbon in SWNT Samples	Jose Herrera/ U Oklahoma
1:25	*Discussion*	
1:35	Characterization and Solubility of Functionalized SWCNTs	Michael Holzinger/ U Montpellier
2:00	*Discussion*	
2:10	SWCNT Purity Assessment: Role of NIST	John Henry J. Scott/ NIST
2:35	*Discussion*	

2:45 **BREAK**

SESSION FOUR – NANOTUBE PURITY 3

Session Chair: Pasha Nikolaev

3:00	Evaluating the Purity and Defect Densities of Bulk Single-Wall Nanotube Materials	Anne Dillon/ NREL
3:25	*Discussion*	
3:35	Transmission Electron Microscopy in the Study and Characterization of Carbon Nanotubes	David Luzzi/ U Penn
4:00	*Discussion*	
4:10	Evaluation of the Method for Separation of Semiconducting and Metallic SWCNTs by Raman Spectroscopy	Millie Dresselhaus/ MIT
4:35	*Discussion*	
4:45	Visualization Tools for Purity Estimation of SWCNTs	Stanilaus Wong/ SUNY Stony Brook
5:10	*Discussion*	

5:20 **ADJOURN**

5:20 Meeting: Workshop Organizers and Breakout Session Chairs (15 min.)

SESSION FIVE – POSTERS

6:30 **Reception (Hotel)**
7:30 **Poster Session (Hotel)**

Wednesday May 28th

7:30 **CONTINENTAL BREAKFAST**

SESSION SIX – APPLICATIONS

Session Chair: Thomas Shaffner

8:00	On the Electronic Properties of Carbon Nanotube Field-Effect Transistors - What Do We Know So Far	Joerg Appenzeller/ IBM
8:45	Purity and Polydispersibility Effects in Using Carbon Nanotubes for Super-Tough Continuous Fibers, Actuation, Energy Harvesting & Storage, and Electronic Textiles	Ray Baughman/ UT Dallas

9:30 **BREAK**

SESSION SEVEN – PURITY BREAKOUT

Session Chairs: Pasha Nikolaev, Sivaram Arepalli, Masaka Yudasaka, Richard Cavanagh

9:45 **PURITY BREAKOUT SESSIONS:**
Carbon Content (1 & 2) and Non-Carbon Content (1 & 2)

11:30 **LUNCH**

SESSION EIGHT – DISPERSION 1

Session Chair: Masaka Yudasaka

12:20 pm	Review of the Purity of SWCNT Dispersions	Robert Haddon/ UC Riverside
12:55	*Discussion*	
1:05	The Dispersion of Nanotubes into Polymers via Processing	Erik Hobbie/ NIST
1:30	*Discussion*	
1:40	Optical Characterization of SWNTs	Bob Hauge/ Rice University
2:05	*Discussion*	

2:15 **BREAK**

SESSION NINE – DISPERSION 2

Session Chair: Brad Files

2:30	Electrophoretic and Dynamic Light Scattering Spectrophotometer for Evaluating Dispersion of SWCNTs in Various Solutions	Young-Hee Lee/ Sungkyunkwan U
2:55	*Discussion*	
3:05	Characterization of Dispersion in SWNTs for Aerospace Applications	Karla Strong/AFRL-MLBCO
3:30	*Discussion*	
3:40	Evaluation of Dispersion of SWNT in Nanocomposites	Cheol Park/NASA-Langley
4:05	*Discussion*	

SESSION TEN – DISPERSION BREAKOUT

Session Chairs: Brad Files, Cheol Park, Bob Hauge, Millie Dresselhaus

4:15 **DISPERSION BREAKOUT SESSIONS:**
Macro Dispersion (1 & 2) and NanoDispersion (1 & 2)

6:00 **ADJOURN**

Thursday May 29th

7:30 **CONTINENTAL BREAKFAST**

SESSION ELEVEN – SUMMARY

Session Chair: Karla Strong

Purity Breakout Session on Carbon Content:

8:00	Summary 1	Session Chair Pavel Nikolaev
8:10	Summary 2	Session Chair Daniel Resasco
8:20	*Discussion*	

Purity Breakout Session on Non-Carbon Content:

8:30	Summary 1	Session Chair Sivaram Arepalli
8:40	Summary 2	Session Chair Richard Cavanaugh
8:50	*Discussion*	

Dispersion Breakout Session on Macrodispersion Protocols

9:00	Summary 1	Session Chair Bob Hauge
9:10	Summary 2	Session Chair Cheol Park
9:20	*Discussion*	

	Dispersion Breakout Session on Nanodispersion Protocols	
9:30	Summary 1	Session Chair Brad Files
9:40	Summary 2	Session Chair Millie Dresselhaus
9:50	*Discussion*	

10:00 **BREAK**

SESSION TWELVE – PANEL DISCUSSION

Session Chair: Steve Freiman

10:15	Meeting Summary, Prioritization, and Path Forward	Freiman with Panel: Haddon, Yudasaka, Dresselhaus, Baughman
11:45	Closing Remarks	Sivaram Arepalli

12:00 **LUNCH**

	NIST Facilities Tour:	Cindy Montgomery
1:20	Bus Departs from Administration Bldg. 101	
1:30 – 2:00	Tour of NCNR	
2:00	Bus Departs from NCNR	
2:10 – 2:30	Tour of Molecular Electronics Laboratory, Roger Van Zee, Physics Bldg. 221, Room A16	
2:40 – 3:00	Tour of Microanalysis Laboratory, John Henry Scott, Chemistry Bldg. 222, Room A124	
3:10 – 3:30	Tour of Combinatorial Methods Center, Alamgir Karim and Michael Fasolka, Polymers Bldg. 224, Room B210	