## 2010 Calendar

## BYU OCMR

## BRIGHAM YOUNG UNIVERSITY COMPLIANT MECHANISMS RESEARCH

Featuring Scanning Electron Micrographs from the Brigham Young University Compliant Micromechanisms Research Group



The wilted beams of a carbon nanotube MEMS structure reveal that the iron layer on which they were grown was too thin.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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|      | 24  | 25  | 26  | 27  | 28  | 29  | 30  |
| 2010 | 31  |     |     | ΒY  | UQ  |     | ٨R  |



A carbon nanotube forest shown at high magnification. The large amount of surface area inside makes it possible to vapor-deposit material (such as silicon) to turn the mostly-empty forests into strong, solid MEMS structures.

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A through hole in a layer of polysilicon.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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Part of a hinge showing the conformity of the second polysilicon layer.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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| 2010 |     |     |     | ΒY  | UQ  |     | ٨R  |



This long, thin beam uses piezoresistance to measure rotation of the gears.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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| 2010 | 30  | 31  |     | ΒY  | UQ  |     | ٨R  |



Carbon nanotubes grown in patterned arrays result in high aspect ratio structures.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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| 2010 |     |     |     | ΒY  | UØ  |     | ٨R  |



A broken nanoinjector.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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| Jul  | 11  | 12  | 13  | 14  | 15  | 16  | 17  |
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| 2010 |     |     |     | ΒY  | UQ  |     | ٨R  |



SEM image of a thermomechanical in-plane microactuator in motion. The path of the flat edge of the TIM traces out the exponential heating and cooling curves characteristic of a square wave input signal.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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|      | 29  | 30  | 31  |     |     |     |     |
| 2010 |     |     |     | ΒY  | UQ  |     | ٨R  |



The lance on the nanoinjector used to inject individual cells with new DNA.

|          | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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|          | 26  | 27  | 28  | 29  | 30  |     |     |
| 2010     |     |     |     | ΒY  | UQ  |     | ٨R  |



This tooth deflects a piezoresistive beam as the gear teeth rotate past, making it possible to count each of the passing ratchet teeth.

|          | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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| <b>S</b> |     |     |     |     |     | 1   | 2   |
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|          | 24  | 25  | 26  | 27  | 28  | 29  | 30  |
| 2010     | 31  |     |     | ΒY  | UQ  |     | ٨R  |



A dimple in a polysilicon layer.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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|      | 28  | 29  | 30  |     |     |     |     |
| 2010 |     |     |     | ΒY  | UQ  |     | ٨R  |



The lance on the nanoinjector, showing the roughness of the surface.

|      | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
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|      | 26  | 27  | 28  | 29  | 30  | 31  |     |
| 2010 |     |     |     | ΒY  | UQ  |     | ٨R  |



A long displacement mechanism dubbed the "X-bob". A series of compliant "Roberts" straight line mechanisms provide significant linear displacement due to compliant member deflection. This optical image shows the deflected position of the mechanism.

|       | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-------|-----|-----|-----|-----|-----|-----|-----|
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| nuary | 2   | 3   | 4   | 5   | 6   | 7   | 8   |
|       | 9   | 10  | 11  | 12  | 13  | 14  | 15  |
| Ja    | 16  | 17  | 18  | 19  | 20  | 21  | 22  |
|       | 23  | 24  | 25  | 26  | 27  | 28  | 29  |
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