


Three-dimensional printing of biomaterials for applications in regenerative medicine and anesthesiology

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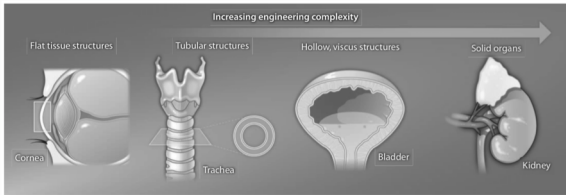
Mikos Research Group
Department of Bioengineering, Rice University

Society for Technology in Anesthesia, Annual Meeting
January 17, 2020



1


Complex Anatomical Structures



Increasing engineering complexity →

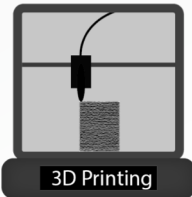
Flat tissue structures: Cornich
Tubular structures: Trachea
Hollow, viscous structures: Bladder
Solid organs: Kidney

Atala, et al. *Science Translational Medicine*; 2012.



2

Three-Dimensional (3D) Printing
From 2D to 3D




3D Printing

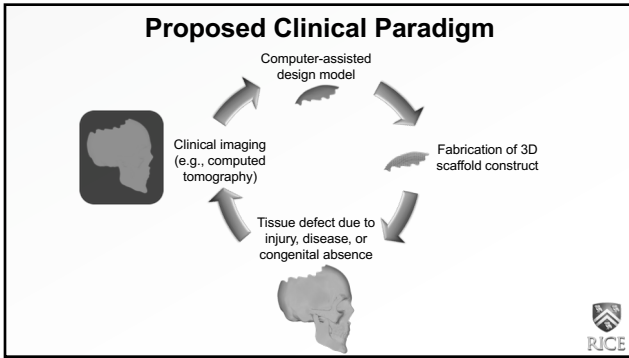
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United States Patent [19] [11] Patent Number: **4,875,330**
Hall [43] Date of Patent: **Mar. 11, 1986**

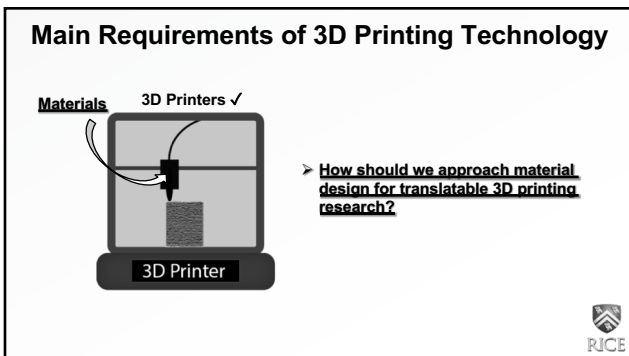
[54] APPARATUS FOR PRODUCTION OF THREE-DIMENSIONAL OBJECTS BY STEREO-LITHOGRAPHY
[75] Invention: Charles W. Hall, Arcadia, Calif.
4,252,534 2/1981 Green 425/162
4,258,861 9/1981 Swanson et al. 367/122
4,292,252 9/1981 Holtz 425/162 X
4,321,155 5/1982 Berk 425/178
4,333,165 6/1982 Swanson et al. 367/127 X



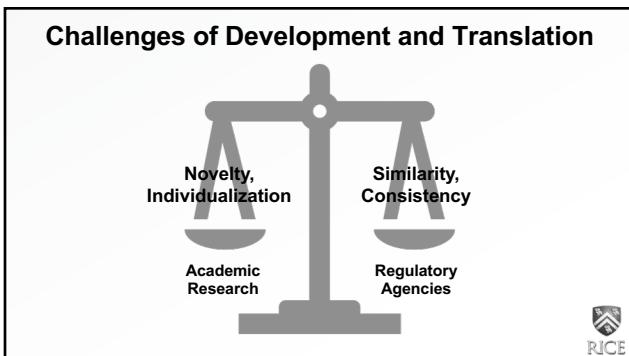
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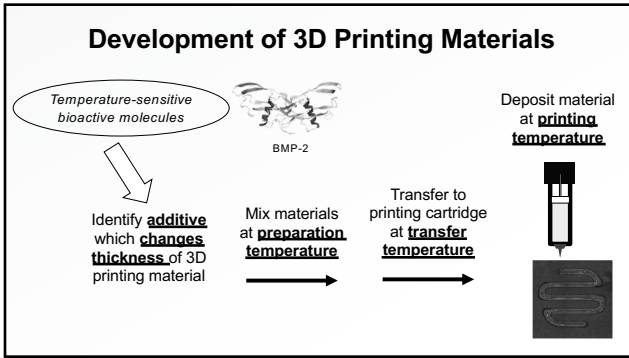
4



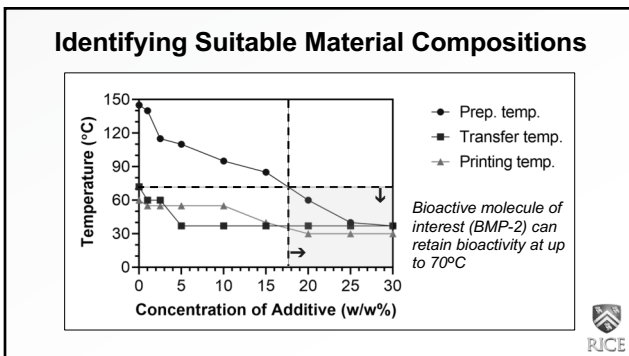
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6



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8

Applications in Anesthesiology

Bioresorbable Airway Splints

Morrison, et al. JAMA Otolaryngology-Head & Neck Surgery; 2017.

Physician Education

Costello, et al. Congenital Heart Disease; 2015.

Gauger, et al. International Journal of Pediatric Otorhinolaryngology; 2017.

9

Acknowledgements

Funding Sources

Dr. Antonios Mikos

Dr. Karla Wyatt



10

Thank you for your attention



11
