

**SIGGRAPH 1990**

**17th International Conference  
On Computer Graphics and  
Interactive Techniques**

**Dallas Convention Center  
August 6th—10th**

## **COURSE NOTES**

# **13**

**CURVE AND SURFACE  
DESIGN: FROM GEOMETRY  
TO APPLICATIONS**

***Chair***

**Gregory M. Nielson  
Arizona State University**

***Lecturers***

**Thomas A. Foley  
Arizona State University**

**Gregory M. Nielson  
Arizona State University**

**Alyn P. Rockwood  
Silicon Graphics Computer Systems**

## **Abstract**

*This course presents geometric foundations for curve and surface design, including: Bezier curves and curve interpolation, B-spline and NURBS curves, geometric continuity, tensor product surfaces, Coons and Gordon surfaces, Bezier triangles, trimmed NURBS surfaces and surface interrogation. The presentation will rely on intuitive geometric concepts, with applications to practical design problems. Live interactive demonstrations will be given. Course notes include the slides presented, a diskette of programs and a text book which contains C-source code for 30 CAGD algorithms*

## **Lecturer Biographies**

**Thomas A. Foley** is an Associate Professor in the Computer Science Department at Arizona State University. His primary teaching, research and publishing are in the areas of computer aided geometric design, multivariate data fitting, computer graphics and scientific visualization. He has been a faculty member of Cal. Poly. San Luis Obispo and the University of Nevada, Las Vegas, and he has done research at Lawrence Livermore National Laboratory for several years. He is a member of the Executive Committee of the IEEE Computer Society Technical Committee on Computer Graphics. Tom received his Ph. D from Arizona State University in 1979.

**Gregory M. Nielson** is a professor of computer science at Arizona State University where he teaches and does research in the areas of computer graphics, computer aided geometric design and scientific visualization. He has published and lectured widely on curve and surface design and scattered data fitting. He is on the editorial board of a variety of CAGD, computer graphics and scientific visualization journals and he currently chairs the IEEE Computer Society Technical Committee on Computer Graphics. He received his Ph.D from the University of Utah.

**Alyn P. Rockwood** has worked in the development of visual simulation for Evans and Sutherland, developed blending surfaces for Shape Data Ltd's ROMULUS modeler and developed rendering methods for trimmed surfaces for both Evans and Sutherland and Silicon Graphics Inc. He is currently in the research group at SGI. He received his PhD from Cambridge University.

## Schedule

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| 1. Bezier Curves<br>Gregory M. Nielson                     | 8:30-9:00   |
| 2. Curve Interpolation<br>Thomas A. Foley                  | 9:00-9:30   |
| 3. B-spline Curves<br>Alyn P. Rockwood                     | 9:30-10:00  |
| <b>BREAK</b>   | 10:00-10:15 |
| 4. NURBS Curves<br>Alyn P. Rockwood                        | 10:15-10:45 |
| 5. Geometric Continuity<br>Gregory M. Nielson              | 10:45-11:15 |
| 6. Tensor Product Surfaces<br>Thomas A. Foley              | 11:15-11:45 |
| <b>LUNCH</b>   | 11:45-1:15  |
| 7. Coons Patches and Gordon Surfaces<br>Gregory M. Nielson | 1:15 - 1:45 |
| 8. Triangular Bezier Patches<br>Gregory M. Nielson         | 1:45-2:15   |
| 9. Trimmed NURBS Surfaces<br>Alyn P. Rockwood              | 2:15-2:45   |
| <b>BREAK</b>   | 2:45-3:00   |
| 10. Surface Interrogation<br>Thomas A. Foley               | 3:00-3:30   |
| 11. Special Topics<br>Thomas A. Foley                      | 3:30-4:00   |
| 12. Review and Recommendations<br>Alyn P. Rockwood         | 4:00-4:30   |

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