CLAIMS

~~What is claimed is:~~

1. A pre-primary articular implant component for repairing a joint of a patient, said component comprising:

(a) an outer, joint-facing surface comprising a bearing surface portion; and

(b) an inner, bone-facing surface comprising one or more ~~patient-engineered~~ bone cut facets ~~selected~~ based on and/or designed from patient-specific data;

characterized in that the bearing surface portion has a sagittal profile derived from patient-specific data including image data of the joint of the patient.

2. The pre-primary articular implant component of claim 1, wherein the bearing surface portion has a standard coronal profile.

3. The pre-primary articular implant component of claim 2, wherein the standard coronal profile includes standard radii or curvature in one or more directions.

~~2~~4. The pre-primary articular implant component of claim 1, wherein the one or more patient-engineered bone cut facets are selected and/or designed from patient-specific data to minimize the amount of bone resected in one or more corresponding predetermined resection cuts, or wherein the one or more patient-engineered bone cut facets substantially negatively-match one or more predetermined resection cuts, wherein optionally the predetermined resection cuts are at a first depth that allows, in a subsequent procedure, removal of additional bone to a second depth required for a traditional primary implant component.

~~3. The pre-primary articular implant component of claim 1, wherein the one or more patient-engineered bone cuts substantially negatively-match one or more predetermined resection cuts.~~

~~4. The pre-primary articular implant component of claim 3, wherein the predetermined resection cuts are at a first depth that allows, in a subsequent~~

~~procedure, removal of additional bone to a second depth required for a traditional primary implant component.~~

~~5. The pre-primary articular implant component of claim 1, wherein the pre-primary articular implant component is selected from the group consisting of a knee joint implant component, a hip joint implant component, a shoulder joint implant component, and a spinal implant component.~~

~~6. The pre-primary articular implant component of claim 1, wherein the pre-primary articular implant component is a knee joint implant component.~~

~~7. The pre-primary articular implant component of claim 1, wherein the pre-primary articular implant component is a femoral implant component.~~

~~8~~5. The pre-primary articular implant component of claim 1, further comprising six or more patient-engineered bone cut facets, or
further comprising an implant component thickness in one or more regions that is selected and/or designed from patient-specific data to minimize the amount of bone resected,
wherein optionally the one or more regions comprises the implant component thickness perpendicular to a planar bone cut facet and between the planar bone cut facet and the joint-surface of the implant component.

~~9. The pre-primary articular implant component of claim 1, further comprising an implant component thickness in one or more regions that is selected and/or designed from patient-specific data to minimize the amount of bone resected.~~

~~10. The pre-primary articular implant component of claim 9, wherein the one or more regions comprises the implant component thickness perpendicular to a planar bone cut and between the planar bone cut and the joint-surface of the implant component.~~

~~11. A method for minimizing resected bone from a single patient in need of an articular implant replacement procedure, the method comprising:~~

~~(a) identifying unwanted tissue from one or more images of the patient's joint;~~
~~(b) identifying a combination of resection cuts and implant component features that remove the unwanted tissue and also provide maximum bone preservation; and~~
~~(c) selecting and/or designing for the patient a combination of resection cuts and implant component features that provide removal of the unwanted tissue and maximum bone preservation.~~

~~12~~6. A method for making an articular implant component for a single patient in need of an articular implant replacement procedure, the method comprising:
(a) identifying unwanted tissue from one or more images of the patient's joint;
(b) identifying a combination of resection cuts and implant component features that remove the unwanted tissue and also provide maximum bone preservation; and
(c) selecting and/or designing a combination of resection cuts and/or implant component features that provide removal of the unwanted tissue and maximum bone preservation, comprising selecting and/or designing a patient-engineered or patient-specific sagittal profile of a bearing surface portion of an outer joint-facing surface of the articular implant component derived from patient specific data including image data of the joint of the patient,
optionally wherein step (c) comprises designing for the single patient a combination of resection cuts and implant component features that provide removal of the unwanted tissue and maximum bone preservation.

~~13. The method of claim 11 or 12, wherein the unwanted tissue is diseased tissue or deformed tissue.~~

~~14. The method of claim 11 or 12, wherein step (c) comprises designing for the single patient a combination of resection cuts and implant component features that provide removal of the unwanted tissue and maximum bone preservation.~~

~~15. The method of claim 14, wherein designing comprises manufacturing.~~

7. The method of claim 6, wherein step (c) further comprises selecting a standard coronal profile, or selecting and/or designing a patient-engineered or patient-specific coronal profile.

8~~16~~. The method of ~~any preceding~~ claim 6, ~~wherein~~ characterized in that the implant component features in step (c) include one or more of the features selected from the group consisting of implant thickness, bone cut number, bone cut angles, and/or bone cut orientations.

9~~17~~. The method of claim 6~~11 or 12~~, ~~wherein~~characterized in that a bone preservation measurement is selected from the group consisting of total volume of bone resected, volume of bone resected from one or more resection cuts, volume of bone resected to fit one or more implant component bone cuts, average thickness of bone resected, average thickness of bone resected from one or more resection cuts, average thickness of bone resected to fit one or more implant component bone cuts, maximum thickness of bone resected, maximum thickness of bone resected from one or more resection cuts, maximum thickness of bone resected to fit one or more implant component bone cuts.

10~~18~~. The method of claim 6~~11 or 12~~, ~~wherein~~ characterized in that step (a) also includes identifying a minimum implant component thickness for the single patient, wherein optionally step (b) also includes identifying a combination of resection cuts and/or implant component features that provide a minimum implant thickness determined for the single patient, or wherein optionally step (c) includes selecting and/or designing the combination of resection cuts and/or implant component features that provides at least a minimum implant thickness for the single patient, or wherein optionally the minimum implant component thickness is based on one or more of femur and/or condyle size or patient weight.

~~19. The method of claim 18, wherein step (b) also includes identifying a combination of resection cuts and/or implant component features that provide a minimum implant thickness determined for the single patient.~~

~~20. The method of claim 18, wherein step (c) includes selecting and/or designing the combination of resection cuts and/or implant component features that provides at least a minimum implant thickness for the single patient.~~

~~21. The method of claim 18, wherein the minimum implant component thickness is based on one or more of femur and/or condyle size or patient weight.~~

~~22. The method of claim 11 or 12, wherein the articular implant component is a femoral implant component.~~

~~23. A femoral implant component comprising: (a) a joint-facing surface comprising a bearing surface portion, and (b) a bone- facing surface comprising six or more bone cuts.~~

~~24. A femoral implant component comprising: (a) a joint-facing surface comprising a bearing surface portion, and (b) a bone- facing surface comprising a distal bone cut having two or more planar facets or portions that are non-coplanar with each other.~~

~~25. The femoral implant component of claim 24, wherein the two or more facets or portions are non-parallel with each other.~~

~~26. The femoral implant component of claim 24, wherein a first of the two or more facets or portions is on a lateral condyle bone-facing surface and the second is on a medial condyle bone-facing surface.~~

~~27. A femoral implant component comprising: (a) a joint-facing surface comprising a bearing surface portion, and (b) a bone-facing surface comprising an anterior bone cut having two or more planar facets or portions that are non-coplanar with each other.~~

~~28. The femoral implant component of claim 27, wherein the two or more planar facets or portions are non-parallel with each other.~~

~~29. A femoral implant component comprising: (a) a joint-facing surface comprising a bearing surface portion, and (b) a bone-facing surface comprising a posterior bone cut having two or more facets or portions that are non-parallel with each other.~~

~~30. The femoral implant component of claim 29, wherein a first of the two or more facets or portions is on a lateral condyle bone-facing surface and the second is on a medial condyle bone-facing surface.~~

~~31. A femoral implant component comprising: (a) a joint-facing surface comprising a bearing surface portion, and (b) a bone-facing surface comprising an anterior chamfer bone cut having two or more planar facets or portions that are non-coplanar with each other.~~

~~32. The femoral implant component of claim 31, wherein the two or more planar facets or portions are non-parallel with each other.~~

~~33. The femoral implant component of claim 31, wherein a first of the two or more facets or portions is on a lateral condyle bone-facing surface and the second is on a medial condyle bone-facing surface.~~

~~34. A femoral implant component comprising: (a) a joint-facing surface comprising a bearing surface portion, and (b) a bone-facing surface comprising a posterior chamfer bone cut having two or more facets or portions that are non-parallel with each other.~~

~~35. The femoral implant component of claim 34, wherein a first of the two or more facets or portions is on a lateral condyle bone-facing surface and the second is on a medial condyle bone-facing surface.~~

~~36. A femoral implant component comprising: (a) a joint-facing surface comprising lateral and medial condylar surface portions, and (b) a bone-facing surface comprising an anterior bone cut, wherein the distance between the anterior bone cut~~

~~and the lateral condylar surface portion is different from the distance between the anterior bone cut and the medial condylar surface portion.~~

~~37. The femoral implant component of claim 36, wherein the two or more facets or portions are substantially non-parallel.~~

~~38. A femoral implant component comprising: (a) lateral and medial condylar portions, and (b) a bone-facing surface comprising a distal bone cut facet that is asymmetric about its center line in a sagittal plane.~~

~~39. The femoral implant component of claim 38, wherein the asymmetric distal bone cut facet lies on the bone-facing surface of the lateral condyle.~~

~~40. The femoral implant component of claim 38, wherein the asymmetric distal bone cut facet lies on the bone-facing surface of the medial condyle.~~

~~41. A femoral implant component having a bone-facing surface comprising one or more bone cuts, wherein at least one of the one or more bone cuts comprises two planar bone cut facets separated by at least one step cut.~~

~~42. The femoral implant component of claim 41, wherein the step cut is substantially perpendicular to at least one of the bone cut facets.~~

~~43. The femoral implant component of claim 41, wherein the step cut rises or falls at about 30 degrees or more from at least one of the bone cut facet planes.~~