

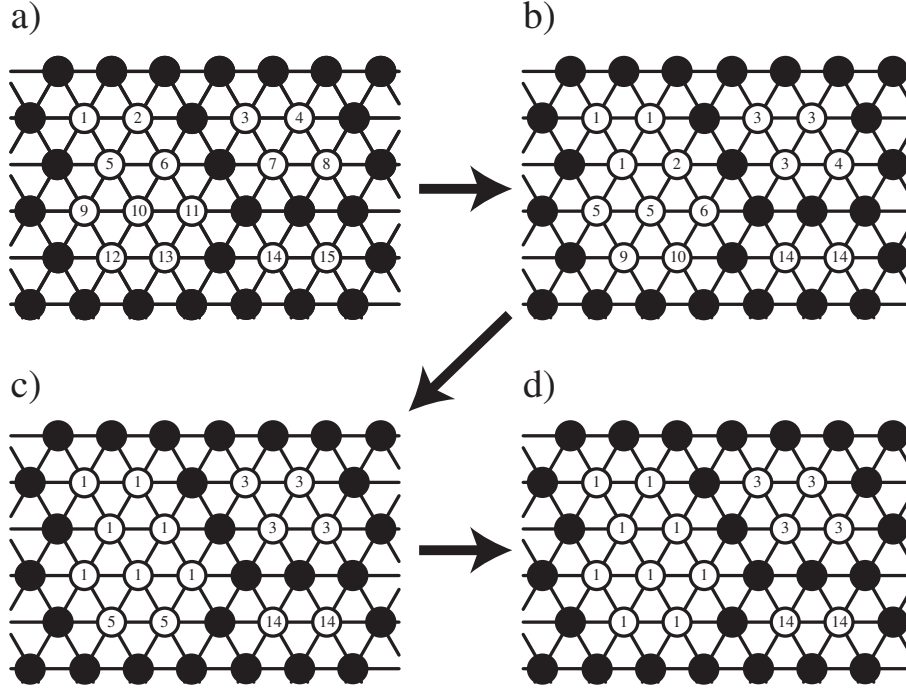


Fig. 4. An example of the procedure for counting the pores.

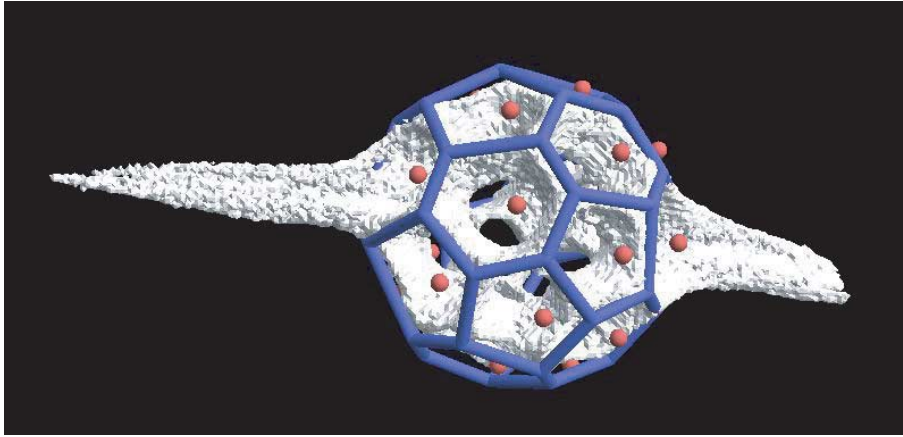


Fig. 5. Result of our method with the original 3D image. Red spheres correspond to the centers of the pores, and the blue frame corresponds to the Voronoi tessellation.

procedure. This procedure is necessary in two cases: when there are unnecessary skeleton-forming points, such as the polar spines shown in Fig. 1, and when there are obvious errors, such as the padding of pores. The cutoff itself is arbitrary. For example, in the case of Fig. 1, we used only the skeleton-forming points that were between 0.28 and 0.45 units from the origin.

We counted the number of pores and determined their shapes as follows: 1) the skeleton-forming points were mapped to the grid points, 2) the number of pores was determined by counting the clusters on the grid, and 3) Voronoi tessellation was applied to the centers of the pores in order to determine the approximate structure of the skeleton.

First, we mapped the skeleton-forming points to the grid points. This procedure consisted of mapping the skeleton-forming points to the surface of the unit sphere and approx-

imating each point by the nearest grid point. In order to map the skeleton-forming points to a spherical surface, we normalized their position vector with their length. Figure 3b shows the result of this first step. Next, we determined the nearest grid point for each normalized skeleton-forming point by selecting the grid point for which the inner product of that point and the normalized position vector was greatest. The values of the corresponding grid points were set to 0, and the values of the remaining grid points were set to 1. The small spheres in Fig. 3c show the result of the grid approximation; they correspond to the grid points set to 0. For clarity, the back of the hemisphere is hidden. It is obvious that there should be an appropriate number of grid points, N , for the 3D data set such that the resolution of the grid points does not exceed the resolution of the raw data. When there are too few grid points, some pores are padded. When