Peter Dykhuis was born in London, Ontario. He graduated in 1978 with a BFA from Calvin College in Grand Rapids, Michigan, then moved to Toronto, Ontario, where he established an active studio practice and worked for various galleries in the region. In 1991 he moved to Halifax, Nova Scotia, where he continues to live and practice.

Dykhuis has exhibited in artist-run centres and public galleries throughout Canada, notably: YYZ and Mercer Union in Toronto, Ontario; Plug In ICA in Winnipeg, Manitoba; the Owens Art Gallery in Sackville, New Brunswick; Eye Level Gallery and Dalhousie Art Gallery in Halifax, Nova Scotia; and the Art Gallery of Regina in Saskatchewan. He is a member of the Red Head Gallery in Toronto and participated in solo and group projects from 2004 to the present. In January 2007, Saint Mary's University Art Gallery in Halifax mounted an overview exhibition with a full colour catalogue of projects from the previous ten years titled You Are Here that toured to Museum London in Ontario in 2010.

Dykhuis has participated in group shows in the United States in: Flint, Michigan; Nashville, Tennessee; Chicago, Illinois; Dallas, Texas; Richmond, Virginia, and Buffalo, New York. On the international stage, he has exhibited at The Embassy of Canada in Tokyo in 1998 and installed Pressure Today at the conference Cartography and Art – Art and Cartography in Vienna, Austria, in 2008. You Are Here (Works on Paper) was presented at the Sydney College of the Arts in Australia in 2009. New clipboard based work were displayed in the exhibition The Art of Mapping organized by TAG Fine Art in London, England, in late Fall of 2011.

Throughout this period, Dykhuis has been awarded numerous grants from federal and provincial agencies. In 2001 he received the Juror's Award in Encaustic Works 01 at the Muroff-Kotler Visual Art Gallery, Ulster County Community College, New York, and he was also the 2003 winner for Eastern Canada in the New Canadian Painting Competition sponsored by RBC Investments and the Canadian Art Foundation. In concert with his exhibition practice, Dykhuis has presented papers at the College Art Association in: Atlanta, Georgia, in 2005; Dallas, Texas, in 2008; Los Angeles in 2009; New York in 2011 with another session pending in Chicago in 2014. He has also presented at the Southeastern College Art Conference in: Little Rock, Arkansas, in 2005; Nashville, Tennessee, in 2006; Charleston, West Virginia, in 2007; New Orleans, Louisiana, in 2008 with a pending session in Sarasota, Florida, in 2014.

Parallel to this, Dykhuis developed a career as an arts administrator, curator and critical writer. In the early 1980s, he designed and installed traveling exhibitions for the Art Gallery of Ontario, then worked as a freelance exhibition designer and architectural model-maker. After moving to Halifax, Dykhuis became affiliated with the Anna Leonowens Gallery at the Nova Scotia College of Art and Design, becoming the gallery's Director in 1996. He has curated six exhibitions for the Art Gallery of Nova Scotia and written reviews for ARTSatlantic, C Magazine, Parachute, Canadian Art, Art Papers and Border Crossings. In August 2007, Dykhuis became the Director/Curator of Dalhousie Art Gallery at Dalhousie University in Halifax where he is responsible for all administration and programming.

Dykhuis is continuing to collaborate with artist-poet-curator Gil McElroy on a series of projects titled Cold War Artifacts. He has also worked with Halifax-based dancer/choreographer Lisa Phinney in the set design of dance projects, notably her 2009 production titled Analogy for Solid Bones. Along with Phinney, dancer Sarah Rozee and spoken word artist Ardath Whynacht, Dykhuis formed the trans-disciplinary collective named PHIN in 2012 who is producing works slated for dance stages, art galleries, performance venues and public outdoor sites.