

**Druce K. Crump**  
**Senior Scientist**  
druce@isotherapeutics.com

**Education**

1978 M.S. (Chemistry), Sam Houston State University, Huntsville, TX  
1977 B.S. (Chemistry), Sam Houston State University, Huntsville, TX

**Experience**

**IsoTherapeutics Group, LLC**

2009 – Senior Scientist

**The Dow Chemical Company, Freeport, TX 1982-2006**

1999 – 2008 Chelants Research Leader  
Product Development and Production Plant Support  
1992 – 1999 Research Associate  
Metal ion Control Research for Pulp and Paper, Enhanced  
Biodegradability, and Chelating Agents Production Plant Support  
1987 – 1992 Project Leader  
Development and Commercialization of Metal Ion Control Agents for Oil,  
Cooling Water and Chemical Process Market Segments  
1983 – 1987 Senior Research Chemist  
Discovery Research, Metal ion Control Products and Systems  
1980 – 1983 Research Chemist  
Metal ion Control Products Research and Commercialization; Boiler  
Water Treatment Programs, Micronutrients  
1979 - 1980 Chemist  
Amine Derivatives for High Temperature Polymers

**Publications & Presentations**

K.A. Selting; J.C. Lattimer; A.R.Ketring; J. Bryan; D.Crump; J. Simon;  
R.K. Frank; C.J. Henry, "Hematologic Sparing of Samarium-153-DOTMP,  
a Novel Bone-Seeking Radiopharmaceutical Agent for the Treatment of  
Bone Tumors." Presented at American College of Veterinary Radiology  
2011 Annual Scientific Meeting, Oct, 2011, Albuquerque, NM.

Humphrey, RE, Ingram, GS, Crump, DK, "Spectrophotometric  
determination of sulfite with soluble mercury (II) compounds," Sam  
Houston State University, Huntsville, TX, USA. Microchemical Journal,  
Vol. 27, Issue 3, Sept. 1982.

Crump, DK, Leggett, D, "Chelation Fundamentals and Applications," The Dow Chemical Company, 1996 Minimum Effluent Mills Symposium Proceedings.

Frenier, WW, Schlumberger, Wilson, D, Crump DK, Jones, L, The Dow Chemical Company, "Use of Highly Acid-Soluble Agents in Well Stimulation Services," Society of Petroleum Engineers, 2000.

Frenier, WW, Rainey M, Schlumberger, Wilson, D, Crump, D, Jones, L, The Dow Chemical Company, "A Biodegradable Chelating Agent is Developed for Stimulation of Oil and Gas Formations," Society of Petroleum Engineers, 2003.

Kim A. Selting; Jimmy C. Lattimer; Alan R. Ketring; Druce K. Crump; Jaime (Jim) Simon; R. Keith Frank; Carolyn J. Henry; "Samarium-153-DOTMP treatment of spontaneously-occurring bone cancer in dogs as a proof-of-concept model;" J Nucl Med. 2011; 52 (Supplement 1):174

J. Simón, R. K. Frank, D. Crump, J. Rogers, S. Phillips, S. Ellebracht, W. Erwin, N. Ueno, R. Wendt, "Preclinical Evaluation of Sm-153-DOTMP as a Therapeutic Bone-Seeking Radiopharmaceutical;" J Nucl Med. 2011; 52 (Supplement 1):1751

### **U.S. Patents**

4,312,815	"Preparation of a zinc chelate having improved stability"
4,466,826	"Setting retarding compounds for use in cement slurries"
4,469,663	"Scale control in flue gas desulfurization"
4,472,200	"New additives for retarding setting of cement from methylenephosphonated aminohydrocarbylpiperazine-urea adducts"
4,489,203	"Polymeric alkylene phosphoric acid piperazine derivatives as scale inhibitors"
4,500,356	"Methylenephosphonic acid derivatives of bis(aminoalkyl)piperazines as cement set retarding agents"
4,500,469	"Metal ion control compounds based on norbornane"
4,518,777	"Methylene phosphonic acid scale inhibitor compositions derived from aminohydrocarbylpiperazine urea adducts"
4,540,508	"Alkylene phosphonic acid scale inhibitor compositions"
4,560,548	"Bone seeking Tc-99m complexes of phosphonate derivatives of bis(aminoalkyl)piperazines"
4,568,468	"Use of nonbornane derived compounds as threshold agents"
4,568,469	"Use of methylene phosphonic acid compositions derived from aminohydrocarbyl piperazine-urea adducts to inhibit scale"

4,680,396	"Bis(aminoalkyl)piperazine derivatives and their use as metal ion control agents"
4,758,635	"Polyamindoamine based metal ion control compound"
4,770,791	"Control of metal ions using bis(aminoalkyl)piperazine derivatives"
4,786,329	"Asphalt compositions containing anti-stripping additives prepared from amines or polyamines and phosphonates"
4,799,995	"Scale inhibition formulations for kraft digesters"
4,872,996	"Use of aminophosphonic acids to inhibit scale formation and corrosion caused by manganese in water systems"
4,895,600	"Asphalt compositions containing anti-stripping additives prepared from amines or polyamines and phosphonates"
5,098,681	"Process for absorption of sulfur compounds from fluids"
5,208,363	"Preparation of aminonitriles"
5,208,369	"Degradable chelants having sulfonate groups, uses and compositions thereof"
5,258,141	"Degradable chelants having sulfonate groups, uses and compositions thereof"
6,389,594	"Degradable chelants having sulfonate groups, uses and compositions thereof"
5,447,575	"Degradable chelants having sulfonate groups, uses and compositions thereof"
5,481,018	"Amino nitrile intermediate for the preparation of alanine acid"
5,488,130	"Amino nitrile intermediate for the preparation of 2-hydroxypropyl iminodiacetic acid"
5,569,443	"Method for removing hydrogen sulfide from a gas using polyamino disuccinic acid"
5,652,085	"Succinic acid derivative degradable chelants, use and composition thereof"
5,691,120	"Succinic acid derivative degradable chelants, use and composition thereof"
5,726,341	"Ammine nitrile intermediate for the preparation of 2-hydroxyethyl iminodiacetic acid"
5,733,858	"Succinic acid derivative degradable chelants, use and composition thereof"
5,817,613	"Amino nitrile intermediate for the preparation of 2-hydroxyethyl iminodiacetic acid"
5,846,925	"Succinic acid derivative degradable chelants, use and composition thereof"
6,465,690	"Process for the preparation of polyamino succinic acids and derivatives thereof"

**Awards &  
Honors**

20+ Internal Awards – Including Significant Recognition Award  
10+ New Products Commercialized  
81 Internal Reports  
Effort resulting in multi-million dollar benefits including new product sales,  
savings from internal problem and savings provided to customer.

**Professional  
Organizations**

American Chemical Society

**Community  
Activities**

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